# SECTION 4.10
# Noise and Vibration

This section describes the existing noise environment in the vicinity of the RSP Area, and evaluates the potential for construction and operation of the proposed projects to result in significant impacts associated with noise and vibration.

The NOP for this Draft SEIR was circulated for public review beginning on June 26, 2015. During the public comment period, one letter was received that included comments associated with noise issues related to the proposed MLS Stadium. The comments expressed concerns related to the potential for excessive noise that would result from the proposed MLS Stadium, especially during soccer matches and other events that were not studied in the 2007 RSP EIR (comment letter from the River District, see Appendix B). This issue has been addressed (see Section 4.10.3).

The analysis included in this section was developed based on field investigations to measure existing noise levels, as well as data provided in the 2007 Railyards Specific Plan (RSP) Draft Environmental Impact Report,[1] the City of Sacramento 2035 General Plan,[2] the City of Sacramento 2035 General Plan Master Environmental Impact Report,[3] the Federal Transit Administration's (FTA's) Transit Noise and Vibration Impact Assessment,[4] and the Federal Highway Administration (FHWA) Noise Prediction Model based upon vehicular trip data provided by Fehr & Peers and reported in section 4.12, Transportation and Circulation.

### *Issues Addressed in the 2007 RSP EIR*

The 2007 RSP EIR focused on the existing noise environment in the vicinity of the RSP Area and the potential for the RSP to significantly increase noise and vibration levels due to project construction and operation. Those same issues are still applicable to the RSPU and other proposed projects in the RSP Area, and are discussed in this section.

1 PBS&J/EIP, 2007. *Railyards Specific Plan Draft Environmental Impact Report (SCH No. 2006032058).* August 2007.

2 City of Sacramento, 2015. *City of Sacramento 2035 General Plan.* Adopted March 3, 2015.

3 City of Sacramento, 2015. *City of Sacramento 2035 General Plan Master Environmental Impact Report* (SCH No. 2012122006). Certified March 3, 2015.

4 Federal Transit Administration, 2006. *Transit Noise and Vibration Impact Assessment*. May 2006.

## 4.10.1 Environmental Setting

The environmental setting, fundamentals of noise and vibration, and existing noise levels are discussed on pages 6.8-1 through 6.8-9 of the 2007 RSP Draft EIR. Other than the existing noise levels, the environmental setting related to noise and vibration has not materially changed since certification of the 2007 RSP EIR. The following discussion is based on the 2007 RSP EIR setting; only the ambient noise levels and citations are updated.

### Fundamentals of Environmental Sound and Noise

Sound can be described in terms of amplitude (loudness) and frequency (pitch). The standard unit of sound amplitude measurement is the decibel (dB). The decibel scale is a logarithmic scale that describes the intensity of the pressure vibrations that make up a sound. The pitch of the sound is correlated to the frequency of the sound's pressure vibration. Because humans are not equally sensitive to a given sound level at all frequencies, a special scale has been devised that specifically relates noise to human sensitivity. The dBA does this by placing more importance on frequencies that are more noticeable to the human ear.

The term 'noise' is typically used to denote unwanted sound. Typically, noise in any environment consists of a base of steady "background" noise made up of many distant and indistinguishable noise sources. Superimposed on this background noise is the sound from individual local sources. These sources can vary from an occasional aircraft or train passing by to virtually continuous noise from traffic on a major highway. **Table 4.10-1** lists the A-weighted average sound levels commonly encountered in various environmental situations.

Several rating scales have been developed to analyze the adverse effect of noise on people. Since environmental noise fluctuates over time, these scales consider that the effect of noise upon people is largely dependent upon the volume of the noise, as well as the time of day when the noise occurs. Those that are applicable to this analysis are as follows:

- $L_{eq}$, the equivalent energy noise level, is the average acoustic energy content of noise for a stated period of time. Thus, the $L_{eq}$ of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. For evaluating community impacts, this rating scale does not vary, regardless of whether the noise occurs during the day or the night.

- $L_{dn}$, the Day Night Average Level is a 24-hour average Leq with a 10 dBA "weighting" added to noise during the hours of 10:00 pm to 7:00 am to account for noise sensitivity in the nighttime.

- The Community Noise Equivalent Level (CNEL), is an $L_{dn}$ with an additional 5 dBA "penalty" added for the evening hours between 7:00 pm and 10:00 pm.

- The Single Event Noise Level (SEL), is the constant noise level that would deliver the same acoustic energy to the ear of a listener during a one-second exposure as the real and variable noise would deliver over its entire time of occurrence.

**TABLE 4.10-1.**
**REPRESENTATIVE ENVIRONMENTAL SOUND LEVELS**

| Common Outdoor Activities | Noise Level (dBA) | Common Indoor Activities |
|---|---|---|
| | 110 | Rock Band |
| Jet Fly-over at 100 feet | 105 | |
| | 100 | |
| Gas Lawnmower at 3 feet | 95 | |
| | 90 | |
| | 85 | Food Blender at 3 feet |
| Diesel Truck going 50 mph at 50 feet | 80 | Garbage Disposal at 3 feet |
| Noisy Urban Area during Daytime | 75 | |
| Gas Lawnmower at 100 feet | 70 | Vacuum Cleaner at 3 feet |
| Commercial Area | 65 | Normal Speech at 3 feet |
| Heavy Traffic at 300 feet | 60 | |
| | 55 | Large Business Office |
| Quiet Urban Area during Daytime | 50 | Dishwasher in Next Room |
| | 45 | |
| Quiet Urban Area during Nighttime | 40 | Theater, Large Conference Room (background) |
| Quiet Suburban Area during Nighttime | 35 | |
| | 30 | Library |
| Quiet Rural Area during Nighttime | 25 | Bedroom at Night, Concert Hall (background) |
| | 20 | |
| | 15 | Broadcast/Recording Studio |
| | 10 | |
| | 5 | |
| Lowest Threshold of Human Hearing | 0 | Lowest Threshold of Human Hearing |

Source: Caltrans, 2013. *Technical Noise Supplement*. September, 2013.

Community noise exposures from continuous sources such as motor vehicle traffic, trains, etc. are usually represented by 24-hour descriptors, such as $L_{dn}$ or CNEL. One-hour and shorter-period $L_{eq}$ are useful to characterize noise generated by short term activities, such as the operation of construction equipment. SEL is commonly used to quantify the impacts of repetitive, reasonably discrete noise events, such as train pass-by events and aircraft flyovers. In outdoor environments where the dominant noise sources are transportation-related (e.g., on-road motor vehicles, aircraft), there are fairly strong relationships among the first three of the above-mentioned

descriptors: $L_{dn}$ can be about 2 dBA less than peak-daytime hourly $L_{eq}$,[5] while $L_{dn}$ and CNEL typically vary by less than 1 dBA and are often used interchangeably.[6]

## Fundamentals of Ground-borne Noise and Vibration

Ground-borne vibration is sound radiated through the ground and is measured in the U.S. as vibration decibels (VdB). In contrast to air-borne noise, ground-borne vibration is not a phenomenon that most people experience every day. The background vibration velocity level in residential areas is usually 50 VdB or lower, well below the threshold of perception for humans, which is around 65 VdB. Most perceptible indoor vibration is caused by sources within buildings such as operation of mechanical equipment, movement of people, or slamming of doors. Typical outdoor sources of perceptible ground-borne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If the roadway is smooth, the vibration from traffic is rarely perceptible. Common vibration sources and the human and structural response to ground-borne vibration are illustrated in **Table 4.10-2**. The range of interest is from approximately 50 VdB to 100 VdB. Background vibration is usually well below the threshold of human perception and is of concern only when the vibration affects very sensitive manufacturing or research equipment, such as electron microscopes and high resolution photo lithography equipment.[7]

**TABLE 4.10-2.**
**TYPICAL LEVELS OF GROUND-BORNE VIBRATION**

| Human/Structural Response | Velocity Level (VdB) | Typical Sources (50 feet from Source) |
|---|---|---|
| Threshold, minor cosmetic damage fragile buildings | 100 | Blast from construction projects |
| | 95 | Bulldozer and other heavy tracked construction equipment |
| Difficulty with tasks such as reading a Video Display Terminal (VDT) screen | 90 | |
| | 85 | High Speed Rail, upper range |
| Residential annoyance infrequent events (e.g., commuter rail) | 80 | Rapid transit, upper range |
| | 75 | High Speed Rail, typical |
| Residential annoyance frequent events (e.g., rapid transit) | | Bus or truck over bump |
| | 70 | |
| Limit for vibration sensitive equipment. Approx. threshold for human perception of vibration | 65 | Bus or truck, typical |
| | 60 | |
| | 55 | |
| | 50 | Typical background vibration |

Source: U.S. Department of Transportation Federal Railroad Administration, High-Speed Ground Transportation Noise and Vibration Impact Assessment. October 2005. pp. 6-6.

5 Federal Transit Administration, Transit Noise and Vibration Impact Assessment, April 1995, Appendix D.

6 Charles M. Salter Associates, 1998. Acoustics.

7 U.S. Department of Transportation Federal Railroad Administration, High-Speed Ground Transportation Noise and Vibration Impact Assessment. October 2005, pages 6-5.

Accurate estimates of ground-borne vibration are complicated due to the many factors that influence vibration levels at potential receivers. The main factors that have significant effects on levels of ground-borne vibration are:

**Guideway and Operational Factors:** The type and condition of the rails, the type of guideway, the rail support system, the mass and stiffness of the guideway structure, and all of the parameters that relate to the vehicle and operation of the trains can all influence the level of ground-borne vibration. For instance, worn rail and wheel impacts at special track work can substantially increase ground-borne vibration.

**Geology:** Soil conditions are known to have a strong influence on the levels of ground-borne vibration. Among the most important factors are the stiffness and internal damping of the soil and the depth to bedrock. Experience has shown that vibration propagation is more efficient in clay soils as well as areas with shallow bedrock. The latter condition seems to channel or concentrate the vibration energy close to the surface, resulting in ground-borne vibration problems at large distances from the source. Factors such as layering of the soil and depth to water table can also have significant effects on the propagation of ground-borne vibration.

**Receiving Building:** Ground-borne vibration problems occur almost exclusively inside buildings. Therefore, the characteristics of the receiving building are a key component in the evaluation of ground-borne vibration. Vibration may be perceptible to people who are outdoors, but it is very rare for outdoor vibration to cause complaints. The vibration levels inside a building depend on the vibration energy that reaches the building foundation, the coupling of the building foundation to the soil, and the propagation of the vibration through the building structure. The general guideline is that the more massive a building is, the lower its response to incident vibration energy in the ground.[8]

The human response to different levels of ground-borne noise and vibration is described in **Table 4.10-3**. The first column lists vibration velocity levels, and the subsequent two columns list the corresponding noise levels assuming that the vibration spectrum peaks at either 30 hertz or 60 hertz. A hertz (Hz) is a measurement for the frequency of any periodic (repeating) event meaning “one per second.” For instance, the ticking of a clock could be expressed as 1 Hz or one tick per second. Similarly, the human heart can be said to beat at 1.2 Hz or 1.2 beats per second. Generally, the A-weighted noise level will be approximately 40 dB less than the vibration velocity level if the spectrum peak is around 30 Hz, and 25 dB lower if the spectrum peak is around 60 Hz. Achieving either the acceptable vibration or acceptable noise levels does not guarantee that the other will be acceptable. For example, the noise caused by vibrating structural components may be very annoying even though the vibration cannot be felt.[9]

8 U.S. Department of Transportation Federal Railroad Administration, High-Speed Ground Transportation Noise and Vibration Impact Assessment. October 2005. p. 6-7.

9 U.S. Department of Transportation Federal Railroad Administration, High-Speed Ground Transportation Noise and Vibration Impact Assessment. October 2005. p. 6-8.

**TABLE 4.10-3.**
**HUMAN RESPONSE TO DIFFERENT LEVELS OF GROUND-BORNE NOISE AND VIBRATION**

| Vibration Level | Noise Level | | Human Response |
|---|---|---|---|
| | Low-Frequency[1] | Mid-Frequency[2] | |
| 65 VdB | 25 dBA | 40 dBA | Approximate threshold of perception for many humans. Low frequency sound usually inaudible, mid-frequency sound excessive for quiet sleeping areas. |
| 75 VdB | 35 dBA | 50 dBA | Approximate dividing line between barely perceptible and distinctly perceptible. Many people find vibration at this level unacceptable. Low-frequency noise acceptable for sleeping areas, mid-frequency noise annoying in most quiet occupied areas. |
| 85 VdB | 45 dBA | 60 dBA | Vibration acceptable only if there are an infrequent number of events per day. Low-frequency noise unacceptable for sleeping areas, mid-frequency noise unacceptable even for infrequent events with institutional land uses such as schools and churches. |

NOTES:

1. Approximate noise level when vibration spectrum peak is near 30 Hz.
2. Approximate noise level when vibration spectrum peak is near 60 Hz.

Source: Federal Railroad Administration, 2005. *High-Speed Ground Transportation Noise and Vibration Impact Assessment*. October 2005, p. 6-8.

## Physiological Effects of Noise

### *Hearing Impairment/Loss*

Prolonged exposure to high levels of noise can cause hearing impairment, though most cases of hearing impairment tend to be related to occupational, rather than environmental, noise exposure. Outside of occupational noise exposure, deterioration of the hearing capability is caused by diseases, head trauma, hereditary factors, and aging.

### *Sleep Disturbance*

It is estimated that only 10 to 20 percent of the reported cases of sleep disturbance are for reasons relating to transportation noise. Sleep disturbance studies tend to focus on investigating possible secondary effects of sleep disturbance, including reduced perceived sleep quality, increased fatigue, depressed mood or well-being, and decreased performance.[10,11,12,13] Although no specific long-term health effects have been clearly linked with sleep disturbance, sleep disturbance is recognized as intrinsically undesirable and, thus, is considered an adverse noise impact. Sleep disturbance studies have become the basis for predictive models of awakenings caused by

10 Carter, N.L., 1996. Transportation Noise, Sleep, and Possible After-Effects, Environmental International 22, 1996, pp. 105-116.

11 Federal Railroad Administration. 2005. *High-Speed Ground Transportation Noise and Vibration Impact Assessment*. Final report. October 2005.

12 Passchier-Vermeer, W., 1993. Noise and Health. Publication No. A93/02E, Leiden, Netherlands: Health Council of the Netherlands, TNO Institute of Preventative Health Care, 1993.

13 Pearsons, K.S., D.S. Barber, B.G. Tabachnick, S. Fidell, 1995. Predicting Noise-Induced Sleep Disturbance, Journal of the Acoustical Society of America 97, pp. 331-338, 1995.

transportation noise sources. Predicted awakening percentages as a function of indoor SEL levels are shown in **Table 4.10-4**.

**TABLE 4.10-4.**
**SLEEP DISTURBANCE AS A FUNCTION OF SINGLE-EVENT NOISE EXPOSURE**

| Indoor SEL | Average Percent Awakened[1] |
|---|---|
| 45 dBA | 0.8% |
| 50 dBA | 1.0% |
| 55 dBA | 1.2% |
| 60 dBA | 1.5% |
| 65 dBA | 1.8% |
| 70 dBA | 2.2% |
| 75 dBA | 2.8% |
| 80 dBA | 3.4% |
| 85 dBA | 4.2% |

NOTES:

1. Finegold and Bartholomew, A Predictive Model of Noise Induced Awakenings from Transportation Noise Sources, Noise Control Engineering Journal, 2001.

Source: Finegold and Bartholomeq, A predictive Model of Noise induce Awakenings form Transportation Noise Sources, Noise Control Engineering Journal, 2001.

## Existing Noise Setting

The ambient daytime noise levels for the RSP Area are discussed on pages 6.8-6 through 6.8-7 of the 2007 RSP EIR. The ambient noise environment surrounding the RSP Area is primarily the result of traffic noise from Interstate 5 (I-5), which runs north-south through the western side of the proposed RSP Area, and 7th Street, which runs north-south through the center of the RSP Area. Other noise sources in the vicinity include freight and passenger rail pass-by events along the UPRR line which runs east-west between the Depot District and Central Shops District, and on the southern edge of the East End District, as well as light rail pass-by events along the Sacramento Regional Transit (RT) Green Line that runs through the RSP Area along 7th Street.

Since certification of the 2007 RSP EIR several conditions have changed that affect the ambient noise environment in the RSP Area. During the time that the 2007 RSP EIR was prepared, the buildings in the Central Shops District were primarily empty, with the exception of the Boiler Shop and Erecting Shop, which are leased by the California State Railroad Museum (CSRM). The CSRM continues to use the two buildings for repairs and maintenance of trains. Since 2007, Railyards Boulevard has been constructed from 7th Street to Bercut Drive, and 5th Street and 6th Street have been constructed from H Street to Railyards Boulevard, including bridges across the realigned UPRR tracks. It is anticipated that these new roadways will be opened for public use in summer 2016.

Since certification of the 2007 RSP EIR, the project site has been subject to ongoing environmental remediation. Existing remediation activities within the RSP Area that generate noise include the use of heavy construction equipment (e.g., backhoes, bulldozers, excavators) used in excavation/soil movement. The remediation of soils in the RSP Area is anticipated to be complete by 2016; remediation of groundwater contamination will continue for many years, but such activities do not affect ambient noise and vibration in the RSP Area.

Two 24-hour measurements were taken inside the RSP Area on March 28 to March 29, 2007, and April 3 to April 4, 2007. Six 15-minute measurements were taken on May 3, 2007. The locations of these noise measurements can be found in Figure 6.8-1 on page 6.8-7 of the 2007 RSP EIR. The average noise levels for the 24-hour measurements are shown in Table 6.8-5 on page 6.8-7 of the 2007 RSP EIR where noise levels were found to be between 71.8 to 72.4 dBA $L_{dn}$. The average noise levels for the 15-minute measurements are shown in Table 6.8-6 on page 6.8-7 of the 2007 RSP EIR where noise levels were found to be between 60.6 to 69.5 dBA $L_{eq}$. All noise measurements were conducted using a Larson-Davis Model 720 precision sound level meter.

Since the publication of the 2007 RSP EIR, the ambient noise levels in and around the RSP Area has increased due to increases in vehicular and rail traffic, and aircraft overflights. To quantify the current existing ambient noise levels in the project vicinity, a noise survey was conducted in and around the RSP Area. The noise measurement survey was conducted from January 14 to January 16, 2016, and consisted of ten 15-minute short-term noise measurements and two 48-hour long-term noise measurements. These locations are illustrated in **Figure 4.10-1**.

The area surrounding the project site during the noise survey was found to be dominated by localized vehicle traffic noise, as well as rail and light rail activity noise, which were measured to be as high as 70 dBA $L_{eq}$ at some locations. Results of the short- and long-term noise measurements are presented in **Tables 4.10-5** and **4.10-6**, respectively. The ten short-term noise measurements were conducted using a Larson Davis 831 sound level meter (SLM) and the two long-term noise measurements were conducted using Metrosonics Model db-308 SLMs. All SLMs was calibrated before and after the noise measurement survey.

Since the last noise survey conducted at the RSP Area on March 28 to March 29, 2007, and April 3 to April 4, 2007, the onsite noise levels have decrease by approximately 2 to 12 dB. In 2007 the measured day-night noise levels ($L_{dn}$) were found to be 72.4 dBA $L_{dn}$ on the western site of the project site near I-5 and 71.8 dBA $L_{dn}$ on the south-east portion of the project site near the UPPRR rail line. Based on the noise survey conducted on January 14 to January 16, 2016, the highest measured noise levels near I-5 were found to be 70 dBA $L_{dn}$ and 60 dBA $L_{dn}$ on the western portion of the RSP Area. The decrease in noise levels between 2007 and 2016 could be the result of decrease vehicular and rail traffic along I-5 and UPRR rail line, respectively, since 2007.


SOURCE: ESA 2016

Sacramento Railyards Specific Plan Update . 150286

**Figure 4.10-1**

Short and Long-term Noise Measurements

**TABLE 4.10-5.**
**15-MINUTE SHORT-TERM AMBIENT NOISE MONITORING RESULTS**

| Monitor | Start time | $L_{eq}$ (dBA) | $L_{max}$ (dBA) | Primary Noise Source(s) |
|---|---|---|---|---|
| ST-1 | 11:34 | 59 | 64 | North B Street traffic |
| ST-2 | 9:31 | 60 | 75 | 7th Street, Light Rail pass by events |
| ST-3 | 12:24 | 56 | 73 | 8th Street, UPRR pass-by events |
| ST-4 | 12:01 | 64 | 75 | 7th Street, light rail pass by events |
| ST-5 | 13:51 | 70 | 90 | Dos Rios Street traffic |
| ST-6 | 10:05 | 70 | 92 | Interstate 5, UPRR pass by events |
| ST-7 | 10:43 | 67 | 93 | Amtrak pass by events |
| ST-8 | 9:02 | 66 | 69 | Interstate 5 traffic |
| ST-9 | 13:27 | 63 | 75 | 6th Street traffic |
| ST-10 | 12:47 | 55 | 75 | 10th Street traffic |

Source: ESA, 2016.

**TABLE 4.10-6.**
**24-HOUR LONG-TERM AMBIENT NOISE MONITORING RESULTS**

| Monitor | Day One | | | | Day Two | | | |
|---|---|---|---|---|---|---|---|---|
| | Start Date & Time | 24-hour $L_{eq}$ (dBA) | $L_{dn}$ (dBA) | $L_{max}$ (dBA) | Start Date & Time | 24-Hour $L_{eq}$ (dBA) | $L_{dn}$ (dBA) | $L_{max}$ (dBA) |
| LT-1[1] | 1/14/16 8:00 am | 65 | 70 | 67 | 1/16/16 8:00 am | 64 | 68 | 68 |
| LT-2[2] | 1/14/16 9:00 am | 53 | 60 | 57 | 1/16/16 9:00 am | 52 | 58 | 57 |

NOTES:

1. The primary noise sources at LT-1 consisted of vehicular traffic along I-5.
2. Noise sources near LT-2 consisted rail traffic along the UPRR rail line, vehicular traffic along 7th Street and light rail traffic along the Sacramento Regional Transit Light Rail Green Line.

Source: ESA, 2016.

### *KP Medical Center*

The ambient noise environment surrounding the KP Medical Center site is primarily the result of traffic noise from I-5, which passes adjacent to the western side of the KP Medical Center site. Other noise sources in the area include rail pass-by events along the UPRR rail lines, approximately 1,370 feet south of the KP Medical Center site, and light rail pass by events along the RT Green Line adjacent to 7th Street, approximately 1,175 feet east of the KP Medical Center site. As shown in Table 4.10-6, the highest measured noise levels at the KP Medical Center (see LT-1) were found to be 65 dBA $L_{eq}$ and 70 dBA $L_{dn}$. There are no existing uses within the KP Medical Center site.

### *MLS Stadium*

The ambient noise environment surrounding the MLS Stadium site is primarily the result of traffic noise from UPRR rail pass-by events along the UPRR rail lines that pass near the

Stadium's southern boundary, and light rail pass by events along the RT Green Line along 7th Street, approximately 890 feet west of the Stadium site. Other noise sources in the area include vehicular traffic noise along 7th Street, located along the western boundary of the MLS Stadium site. As shown in Table 4.10-6, the highest measured noise levels at the Stadium site (see LT-2) were found to be 53 dBA $L_{eq}$ and 60 dBA $L_{dn}$. There are no existing uses within the Stadium site.

### *Stormwater Outfall*

The ambient noise environment surrounding the Stormwater Outfall site is primarily the result of traffic noise from the elevated structure of I-5 that immediately adjacent to the site. As shown in Table 4.10-5, the highest measured noise levels at the Stormwater Outfall site (see ST-6) were found to be 70 dBA $L_{eq}$. There are no existing uses within the Stormwater Outfall site.

## Sensitive Receptors

Some land uses are considered more sensitive to ambient noise levels than others, due to the amount of noise exposure (in terms of both exposure duration and insulation from noise) and the populations that would be exposed, and the types of activities typically involved. Residences, motels and hotels, schools, libraries, churches, hospitals, nursing homes, auditoriums, and parks and other outdoor recreation areas are land uses with users that are generally more sensitive to noise than are the users of commercial (other than lodging facilities), industrial, and other non-residential land uses.

Currently, sensitive uses located near the RSP Area include primarily single- and multi-family homes (see Figure 4.10-1, Noise Measurement Locations for an aerial view of the study area). Specifically, these nearby noise-sensitive uses include:

- Homes located near the intersection of Water, Bannon, and North B streets (adjacent to RSP Area);
- Homes located near the intersection of D Street and 8th Street;
- Mercy Housing at 7th Street and H Street;
- Ping Yuen Apartments at 5th Street and I Street;
- Riverview Plaza residential tower at 6th and I streets;
- Residential uses on the east side of 7th Street, between F and E streets;
- Lofts at Globe Mills housing at 11th Street and C Street; and
- Creamery at Alkali Flat housing at 10th Street and D Street (approved and under construction).

Normally the City does not consider businesses to be sensitive receptors. However, the KCRA studio, located immediately south of the UPRR tracks between 8th and 10th streets, is an unusual

circumstance because its broadcasting activities could be readily interrupted by excessive noise. As such, this business is treated as a sensitive receptor in this analysis.

## 4.10.2 Regulatory Framework

The 2007 RSP EIR (pages 6.8-9 through 6.8-13) described the federal, state, and local regulatory framework for noise and vibration as it related to the RSP, which included laws, ordinances, regulations, policies, and standards. Since the 2007 RSP EIR, the City of Sacramento has adopted a new General Plan, which was most recently updated in March 2015.[14] The City's updated policies are discussed below. All other regulatory framework discussions in this section are consistent with those discussed in the 2007 RSP EIR.

### Federal

#### *Noise Control Act*

In 1972, the Noise Control Act was established to address the concerns of noise as a growing danger to the health and welfare of the Nation's population, particularly in urban areas. In 1974, in response to the Noise Control Act, the U.S. Environmental Protection Agency (EPA) published Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety. **Table 4.10-7** summarizes U.S. EPA findings for residential land uses.

**TABLE 4.10-7.**
**SOUND LEVELS THAT PROTECT PUBLIC HEALTH (DBA)**

| Category | Measure of Exposure | Indoor | | | Outdoor | | |
|---|---|---|---|---|---|---|---|
| | | Activity Interference | Hearing Loss | To Protect Against Both Effects | Activity Interference | Hearing Loss | To Protect Against Both Effects |
| Residential with Outside Space | $L_{dn}$ | 45 | 70 | 45 | 55 | 70 | 55 |
| Residential with No Outside Space | $L_{dn}$ | 45 | 70 | 45 | - | - | - |

NOTES:

Sound levels are yearly average equivalent in decibels; the exposure period which results in hearing loss at the identified level is a period of forty years.

Source: U.S. Environmental Protection Agency, Information of Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an adequate Margin of Safety, 1974.

#### *Occupational Safety and Health Administration*

The Occupational Safety and Health Administration (OSHA) aims to ensure worker safety and health in the United States by working with employers and employees to create better working environments. With regard to noise exposure and workers, OSHA regulations set forth accepted criteria to protect the hearing of workers exposed to occupational noise. Noise exposure regulations are listed in 29 CFR Section 1910.95. Most applicable to this project, 1910.95(c)(1)

[14] City of Sacramento, 2015. *City of Sacramento 2035 General Plan.* Adopted March 3, 2015.

states that an employer shall administer a hearing conservation program whenever noise exposure levels equal or exceed an 8-hour time-weighted average sound level of 85 dBA.

### *Federal Aviation Administration*

The Federal Aviation Administration (FAA) has published guidelines for land use compatibility in 14 Code of Federal Regulations (CFR) Part 150. For aviation noise analyses, the FAA has determined that the 24-hour cumulative exposure of individuals to noise resulting from aviation activities must be established in terms of $L_{dn}$ as FAA's primary metric. However, the FAA recognizes CNEL as an alternative metric for assessing aircraft (e.g., helicopters) noise exposure in California.

Based on FAA standards, a significant noise impact would occur if analysis shows that the project would cause noise sensitive areas to experience an increase in the ambient noise level of 1.5 dBA CNEL or more when ambient levels are 65 dBA CNEL or higher. In addition, a significant noise impact would occur if noise sensitive land uses would be exposed to levels of 65 dBA CNEL or higher as a result of the project.

According to Chapter 65 of Title 42 of the United States Code, and Articles 3 and 3.5 of Chapter 4 of Division 9 of the Public Utilities Code of the State of California, local enforcement of noise regulations and land use regulations related to noise control of airports (e.g., helistops) are preempted by the FAA.

## State

### *Title 24*

Title 24 of the California Code of Regulations codifies Sound Transmission Control requirements, which establishes uniform minimum noise insulation performance standards for new hotels, motels, dormitories, apartment houses, and dwellings other than detached single-family dwellings. Specifically, Title 24 states that interior noise levels attributable to exterior sources shall not exceed 45 dBA CNEL in any habitable room of new dwellings Title 24, Part 2 requires an acoustical report that demonstrates the achievements of the required 45 dBA CNEL. Dwellings are designed so that interior noise levels will meet this standard for at least ten years from the time of building permit application.

### *Department of Industrial Relations*

The Division of Occupational Safety and Health (DOSH) protect workers and the public from safety hazards through its California Divisions of Occupation Safety and Health (Cal/OSHA) program. The Cal/OSHA Program is responsible for enforcing California laws and regulations pertaining to workplace safety and health and for providing assistance to employers and workers about workplace safety and health issues. DOSH enforces noise standards in the workplace in conjunction with OSHA through the CAL/OSHA program.

# Local

## *City of Sacramento 2035 General Plan*

The following noise and vibration-related goals and policies identified in the Environmental Constraints Element of the *City of Sacramento 2035 General Plan*[15] are relevant to the proposed projects.

**Goal EC 3.1 Noise Reduction. Minimize noise impacts on human activity to ensure the health and safety of the community.**

Policies

EC 3.1.1 **Exterior Noise Standards.** The City shall require noise mitigation for all development where the projected exterior noise levels exceed those shown in **Table 4.10-8** (Table EC 1 in the General Plan), to the extent feasible.

**TABLE 4.10-8.**
**EXTERIOR NOISE COMPATIBILITY STANDARDS FOR VARIOUS LAND USES**

| Land Use Type | Highest Level of Noise Exposure that is Regarded as "Normally Acceptable"[a] ($L_{dn}$[b] or CNEL[c]) |
|---|---|
| Residential—Low Density Single Family, Duplex, Mobile Homes | 60 dBA[d,e] |
| Residential—Multi-family | 65 dBA |
| Urban Residential Infill[f] and Mixed-Use Projects[g] | 70 dBA |
| Transient Lodging—Motels, Hotels | 65 dBA |
| Schools, Libraries, Churches, Hospitals, Nursing Homes | 70 dBA |
| Auditoriums, Concert Halls, Amphitheaters | Mitigation based on site-specific study |
| Sports Arena, Outdoor Spectator Sports | Mitigation based on site-specific study |
| Playgrounds, Neighborhood Parks | 70 dBA |
| Golf Courses, Riding Stables, Water Recreation, Cemeteries | 75 dBA |
| Office Buildings—Business, Commercial and Professional | 70 dBA |
| Industrial, Manufacturing, Utilities, Agriculture | 75 dBA |

NOTES:

a. As defined in the *State of California General Plan Guidelines*, "Normally Acceptable" means that the "specified land use is satisfactory, based upon the assumption that any building involved is of normal conventional construction, without any special noise insulation requirements."
b. $L_{dn}$ or Day Night Average Level is an average 24-hour noise measurement that factors in day and night noise levels.
c. CNEL or Community Noise Equivalent Level measurements are a weighted average of sound levels gathered throughout a 24-hour period.
d. dBA or A-weighted decibel scale is a measurement of noise levels.
e. The exterior noise standard for the residential area west of McClellan Airport known as McClellan Heights/Parker Homes is 65 dBA.
f. With land use designations of Central Business District, Urban Neighborhood (Low, Medium, or High) Urban Center (Low or High), Urban Corridor (Low or High).
g. All mixed-use projects located anywhere in the City of Sacramento.

SOURCE: City of Sacramento, 2015. *City of Sacramento 2035 General Plan.* Adopted March 3, 2015. Page 2-350.

EC 3.1.2 **Exterior Incremental Noise Standards.** The City shall require noise mitigation for all development that increases existing noise levels by more than the allowable increment shown in **Table 4.10-9** (Table EC 2 in the General Plan), to the extent feasible.

[15] City of Sacramento, 2015. *City of Sacramento 2035 General Plan.* Adopted March 3, 2015.

**TABLE 4.10-9.**
**EXTERIOR INCREMENTAL NOISE IMPACT STANDARDS FOR NOISE-SENSITIVE USES (dBA)**

| Residences and Buildings where People Normally Sleep[a] | | Institutional Land Uses with Primarily Daytime and Evening Uses[b] | |
|---|---|---|---|
| Existing $L_{dn}$ | Allowable Noise Increment | Existing Peak Hour $L_{eq}$ | Allowable Noise Increment |
| 45 | 8 | 45 | 12 |
| 50 | 5 | 50 | 9 |
| 55 | 3 | 55 | 6 |
| 60 | 2 | 60 | 5 |
| 65 | 1 | 65 | 3 |
| 70 | 1 | 70 | 3 |
| 75 | 0 | 75 | 1 |
| 80 | 0 | 80 | 0 |

NOTES:

a. This category includes homes, hospitals, and hotels where a nighttime sensitivity to noise is assumed to be of utmost importance.
b. This category includes schools, libraries, theaters, and churches where it is important to avoid interference with such activities as speech, meditation, and concentration on reading material.

SOURCE: City of Sacramento, 2015. *City of Sacramento 2035 General Plan.* Adopted March 3, 2015. Page 2-351.

EC 3.1.3 **Interior Noise Standards.** The City shall require new development to include noise mitigation to assure acceptable interior noise levels appropriate to the land use type: 45 dBA $L_{dn}$ for residential, transient lodgings, hospitals, nursing homes, and other uses where people normally sleep; and 45 dBA $L_{eq}$ (peak hour) for office buildings and similar uses.

EC 3.1.4 **Interior Noise Review for Multiple, Loud Short-Term Events.** In cases where new development is proposed in areas subject to frequent, high-noise events (such as aircraft over-flights, or train and truck pass-by events), the City shall evaluate noise impacts on any sensitive receptors from such events when considering whether to approve the development proposal, taking into account potential for sleep disturbance, undue annoyance, and interruption in conversation, to ensure that the proposed development is compatible within the context of its surroundings.

EC 3.1.5 **Interior Vibration Standards.** The City shall require construction projects anticipated to generate a significant amount of vibration to ensure acceptable interior vibration levels at nearby residential and commercial uses based on the current City or Federal Transit Administration (FTA) criteria.

EC 3.1.6 **Effects of Vibration.** The City shall consider potential effects of vibration when reviewing new residential and commercial projects that are proposed in the vicinity of rail lines or light rail lines.

EC 3.1.7 **Vibration.** The City shall require an assessment of the damage potential of vibration-induced construction activities, highways, and rail lines in close proximity to historic buildings and archaeological sites and require all feasible measures be implemented to ensure no damage would occur.

EC 3.1.8 **Operational Noise.** The City shall require mixed-use, commercial, and industrial projects to mitigate operational noise impacts to adjoining sensitive uses when operational noise thresholds are exceeded.

EC 3.1.9 **Compatibility with Park and Recreation Uses.** The City shall limit the hours of operation for parks and active recreation areas in residential areas to minimize disturbance to residences.

EC 3.1.10 **Construction Noise.** The City shall require development projects subject to discretionary approval to assess potential construction noise impacts on nearby sensitive uses and to minimize impacts on these uses, to the extent feasible.

The proposed projects would generate noise and vibration during short-term construction activities and long-term operations. The proposed project would also locate sensitive residential receptors in an urban environment, subject to noise (primarily from on-road transportation) and vibration (primarily from light rail). Consistent with Policy EC 3.1.1 and as discussed below under Impact 4.10-2, on-road traffic noise associated with the project would result in noise levels that would not exceed the normally acceptable $L_{dn}$ for Urban Residential Infill and Mixed-Use Projects. Also as described under Impact 4.10-2, although the projected noise levels of the project plus existing traffic would exceed the allowable incremental noise levels of Policy EC 3.1.2, no mitigation measures are found to be feasible to reduce this impact. Consistent with policies EC 3.1.3 and EC 3.1.4, new development under the proposed projects would be designed to meet the City interior standards, and interior noise from multiple loud, short-term events was analyzed. Construction vibration impacts were assessed in Impacts 4.10-4 and were determined to be consistent with policies EC 3.1.5, EC 3.1.6, and EC 3.1.7, after mitigation. Operational noise of the proposed projects, including outdoor events at the proposed MLS Stadium, were assessed and mitigated in Impact 4.10-2. The proposed projects would be consistent with policies EC 3.1.8 and EC 3.1.9. Consistent with EC 3.1.10, construction noise of the proposed projects was analyzed and mitigated to the extent feasible in Impact 4.10-1.

### *Sacramento Central City Community Plan*

The City's *Central City Community Plan*[16] does not contain goals and policies specific to noise.

### *City of Sacramento Municipal Code (Noise Control Ordinance)*

The Sacramento Municipal Code includes noise regulations in Title 8 – Health and Safety, Chapter 8.68 – Noise Control (referred to generally as the Noise Control Ordinance). Of the regulations in Chapter 8.68, the following regulations would be applicable to the proposed Project:

- Section 8.68.060 sets standards for cumulative exterior noise levels at residential and agricultural properties, including exterior noise standards of 55 dBA from 7:00 am to 10:00 pm, and 50 dBA from 10:00 pm to 7:00 am. Per Section 8.68.060(b), the allowable decibel increase above the exterior noise standards in any one hour are:
    1. 0 dBA for cumulative period of 30 minutes per hour;
    2. 5 dBA for cumulative period of 15 minutes per hour;
    3. 10 dBA for cumulative period of 5 minutes per hour;
    4. 15 dBA for cumulative period of 1 minutes per hour; or
    5. 20 dBA not to be exceeded for any time per hour.

16 City of Sacramento, 2015. *Central City Community Plan*. Adopted March 3, 2015.

In addition, per Section 8.68.060(c), each of the noise limits above shall be reduced by 5 dBA for impulsive or simple tone noises, or for noises consisting of speech or music. If the ambient noise level exceeds that permitted by any of the first four noise limit categories specified in subsection (b) above, the allowable noise limit shall be increased in 5-dBA increments in each category to encompass the ambient noise level. If the ambient noise level exceeds the fifth noise level category, the maximum ambient noise level shall be the noise limit for that category.

- Section 8.68.160 establishes time frames and noise limits for outdoor recreational activities, including sporting and entertainment events and concerts. Amplified sound at these events (measured no more than 150 feet from the source) is limited to 98 dBA $L_{eq}$ during the months of September and October and 96 dBA $L_{eq}$ during the months of November through August. For outdoor recreational events on Sunday through Thursday, the amplified sound shall commence no earlier than 9:00 am and shall be terminated no later than 10:00 pm. For outdoor recreational events on Friday, Saturday, or a holiday, the amplified sound shall commence no earlier than 9:00 am and shall be terminated no later than 11:00 pm.

- Section 8.68.190 generally prohibits any person from making "any loud, unnecessary or unusual noise which disturbs the peace and quiet of any neighborhood or which causes discomfort or annoyance to any reasonable person of normal sensitiveness residing in the area."

- Section 8.68.080 exempts certain activities from Chapter 8.68, including "noise sources due to the erection (including excavation), demolition, alteration, or repair of any building or structure" as long as these activities are limited to between the hours of 7:00 am and 6:00 pm Monday through Saturday, and between the hours of 9:00 am and 6:00 pm on Sunday. The use of exhaust and intake silencers for internal combustion engines is also required. Construction work can occur outside of the designated hours if the work is of urgent necessity and in the interest of public health and welfare for a period not to exceed 3 days. Section 8.68.080 also exempts noise from any mechanical device, apparatus, or equipment related to or connected with emergency activities or emergency work from Chapter 8.68 requirements.

## 4.10.3 Analysis, Impacts, and Mitigation

### Significance Criteria

Appendix G of the CEQA Guidelines identifies potential significance criteria for the evaluation of impacts related to noise and vibration. Those same criteria, with some minor modifications, are provided below. The criteria listed below are the same as those used in the 2007 RSP EIR. This SEIR assumes implementation of the proposed RSPU, KP Medical Center, MLS Stadium, and/or Stormwater Outfall would have a significant impact related to noise and vibration if it would:

- Result in a substantial permanent increase in ambient exterior noise levels in the project vicinity that exceed standards in the City's General Plan or Noise Control Ordinance;
- Result in residential interior noise levels of 45 dBA $L_{dn}$ or greater caused by noise level increases due to project operation;
- Result in construction noise levels that exceed the standards in the City of Sacramento Noise Control Ordinance;
- Permit existing and/or planned buildings (and persons within) to be exposed to significant vibration due to project construction; or
- Permit adjacent residential and commercial buildings (and persons within) to be exposed to significant vibration due to highway traffic and rail operations.

## Methods and Assumptions

This section evaluates noise and vibration effects on all land uses planned for inclusion in the proposed RSPU, including specific land uses that were not evaluated under the previous 2007 RSP EIR (the KP Medical Center, MLS Stadium, and Stormwater Outfall). In addition to the noise and vibration impacts evaluated under the 2007 RSP EIR, this section evaluates the potential noise impacts on nearby sensitive land uses related to the construction and operation of the proposed KP Medical Center helistop, events at the proposed MLS Stadium, and construction and operation of the proposed Stormwater Outfall.

### *Construction*

#### Noise Levels

Construction noise impacts are assessed based on an analysis of the noise levels that could result from the operation of specified construction equipment compared to existing noise level conditions. Analysis of the proposed projects temporary construction noise effects is based on specific estimates of construction equipment and duration of use from the applicants. Analysis of temporary construction noise effects of specific development scenarios are based on typical construction phases and equipment noise levels. In all cases, the analyses accounted for attenuation of those noise levels due to distances between the construction activity and the sensitive land uses in the site vicinity. Construction noise levels that would be associated with the proposed projects at nearby sensitive land uses locations are estimated using the Federal Highway Administration (FHWA) Roadway Construction Noise Model (RCNM).[17]

Since construction-related noise would be less noticeable during the daytime hours versus the night time hours, construction noise generated outside of the City of Sacramento exempt hours (between the hours of 7:00 am and 6:00 pm Monday through Saturday and between the hours of 9:00 am and 6:00 pm on Sunday) would constitute a significant impact. Construction-related

[17] Federal Highway Administration, 2006. *FHWA Roadway Construction Noise Model User's Guide*. January 2006.

noise generated outside of City of Sacramento exempt hours would result in a substantial noise increase over the existing ambient, which would result in an annoyance.

#### Ground-borne Vibration

For the purposes of this assessment, the methodology described in the Caltrans' *Transportation and Construction Vibration Guidance Manual* was used to evaluate project-related vibration effects to nearby sensitive land uses.[18] Impact pile driving may occur during the construction of the high-rise buildings, the proposed MLS Stadium, and/or the proposed KP Medical Center. This Caltrans guidance manual focuses entirely on addressing vibration from construction activities. Impact pile driving is considered a continuous/frequent intermittent source.[19] According to Caltrans, impact pile driving is considered a continuous/frequent intermittent source. The building damage threshold for historic and some older buildings is 0.25 PPV (in/sec) and the vibration threshold where vibration level increases are considered distinctly perceptible is 0.04 PPV (in/sec) for continuous/frequent intermittent sources. On and off site sensitive receptors exposed to construction vibration levels that would exceed either of these thresholds would be considered to result in a significant impact.

### *Operational*

#### Noise Levels

In a change since the certification of the 2007 RSP EIR, the California Supreme Court recently found that "agencies subject to CEQA generally are not required to analyze the impact of existing environmental conditions on a project's future users or residents." In *California Building Industry Association v. Bay Area Air Quality Management District* (2015) 62 Cal. 4th 369, the Supreme Court explained that an agency is only required to analyze the potential impact of such hazards on future residents if the project would exacerbate those existing environmental hazards or conditions. CEQA analysis is therefore concerned with a project's impact on the environment, rather than with the environment's impact on a project and its users or residents. Thus, with respect to noise and vibration impacts from the existing freight and transport rail pass-by events along the UPRR and RT) rail lines, the City is not required to consider the effects of bringing a new population into an area where such noise and vibration levels exist, because the projects would not increase or otherwise affect the number of freight and transport trips on the existing rail lines that would result in an increase in vibration levels. Nonetheless, in order to provide a complete picture of how the effects of the proposed projects compare to the effects that were disclosed in the 2007 RSP EIR, these impacts are addressed below (see specifically Impact 4.10-2 and Impact 4.10-5).

[18] California Department of Transportation, 2013. *Transportation and Construction Vibration Guidance manual.* September 2013.

[19] California Department of Transportation, 2013. *Transportation and Construction Vibration Guidance manual.* September 2013.

### Roadway Traffic Noise Levels

Roadside noise levels were calculated for selected study street segments near sensitive land uses around the proposed project site areas based on information provided in the traffic analysis presented in Section 4.12, *Transportation and Circulation*. The street segments selected for analysis are those expected to be most directly impacted by project-related traffic, which, for the purpose of this analysis, are the streets that are nearest to the proposed project sites that also experience the highest traffic volumes. These streets are forecast to experience the greatest percentage increase in traffic generated by the proposed projects. The noise levels are calculated using the FHWA's Traffic Noise Prediction Model (FHWA-RD-77-108) and traffic volumes identified in the transportation and circulation study conducted for this SEIR (see Appendix J.1). Future traffic noise levels that are found to exceed the allowed City of Sacramento's exterior incremental noise impact standards (see Table 4.10-9) or exterior noise compatibility standards (see Table 4.10-8) would result in a significant impact.

### Existing Train Noise Levels

As shown in Figure 4.10-1, noise measurement location LT-2 is within line-of-sight of both the Sacramento RT and UPRR lines, and 7$^{th}$ Street. Although the noise sources that contributed to the levels measured at LT-2 included vehicular traffic along 7$^{th}$ Street, for the purposes of this analysis it is assumed that the day-night noise levels measured at LT-2 conservatively represent those generated by the daily RT and freight train traffic. Noise levels that were found to exceed the City of Sacramento compatibility noise standards for urban residential infill and mixed-use projects of 70 dBA $L_{dn}$ at potential future sensitive receptor locations were found to result in a significant impact.

### Helicopter Noise Levels

The Aviation Environmental Design Tool (AEDT), Version 2B, was used to quantify helicopter noise exposure in the vicinity of the two alternative proposed helistop locations. The AEDT is the FAA approved noise model for quantifying aircraft noise. The model input requires information specific to the helistop, including the total number of helicopter operations, the flight paths that would be used to access and depart the helistop, the specific helicopter types, and the time of day at which the operations would occur. The characteristics of the KP Medical Center helistop operations were obtained from the *Initial Assessment of Helicopter Flight-Track for Kaiser Permanente's Scope of Work.*[20]

### Non-Transportation Noise Sources

In addition, non-transportation noise sources, such as loading docks, HVAC equipment, and MLS Stadium event noise, are assessed below. Significance is based on comparison of the project's operational noise levels to the City Noise Control Ordinance standards.

[20] Flight Safety Institute, 2015. *Initial Assessment of Helicopter Flight-Track for Kaiser Permanente's Scope of Work.* August 28, 2015.

## Impacts and Mitigation Measures

**Impact 4.10-1: Construction of the proposed projects could generate noise that would conflict with City standards.**

The 2007 RSP EIR discussed project-related construction noise impacts under Impact 6.8-1 on pages 6.8-15 through 6.8-18, and concluded that the temporary increases in noise levels associated with general construction activities would result in a significant impact. Construction activities proposed under the 2007 RSP included site grading, excavation for infrastructure and building foundations, pile driving, building construction, and paving and landscaping installation. Although it was assumed that the hours of construction would be limited to the hours specified as acceptable under the Sacramento Noise Control Ordinance, the 2007 RSP EIR concluded that due to the expected impact pile driving activities, construction noise would substantially increase ambient noise levels at nearby sensitive receptors. The 2007 RSP EIR also recognized that the 2007 RSP would be developed incrementally. Thus, the residents of new future residences developed within the RSP Area consistent with the 2007 RSP, would be close to onsite construction activities and would be exposed to construction noise.

### *Railyards Specific Plan Update*

Under the proposed RSPU, construction noise levels in and around the RSP Area would fluctuate depending on the type, number, and duration of use of various pieces of construction equipment, much like those discussed under the 2007 RSP. **Table 4.10-10** shows typical noise levels produced by the types of construction equipment that would likely be used during construction of the RSPU.

**TABLE 4.10-10.**
**REFERENCE CONSTRUCTION EQUIPMENT NOISE LEVELS**
**(50 feet from source)**

| Type of Equipment | $L_{max}$, dBA | Hourly $L_{eq}$, dBA/% Use[1] |
|---|---|---|
| Backhoe | 80 | 76/40% |
| Grader | 85 | 81/40% |
| Concrete Mixer Truck | 85 | 81/40% |
| Loader | 80 | 76/40% |
| Pneumatic Tools | 85 | 82/50% |
| Air Compressor | 80 | 76/40% |
| Impact Pile Driver | 95 | 88/20% |
| Auger Drill Rig | 85 | 78/20% |
| Excavator | 85 | 81/40% |

NOTES:

1. Percent used during the given time period (usually an hour – hourly $L_{eq}$) were obtained from the FHWA Roadway Construction Noise Model User's Guide.

SOURCE: Federal Highway Administration, 2006. *FHWA Roadway Construction Noise Model*. January 2006.

As previously discussed in the *Methods and Assumptions* discussion in Section 4.10.3, above, construction activities that could occur outside of the City of Sacramento's construction exempt hours (between the hours of 7:00 am and 6:00 pm Monday through Saturday and between the hours of 9:00 am and 6:00 pm on Sunday) would constitute a significant impact. Unlike the daytime hours, construction activities during the nighttime hours, when ambient noise levels would be at their lowest, would substantially increase ambient noise levels that could result in an annoyance at nearby sensitive land uses.

Construction of the RSPU, much like the 2007 RSP, would consist of site grading, excavation for infrastructure and building foundations, building construction, and paving and landscaping installation. All of these construction activities would require onsite staging areas to store off-road equipment and to temporarily hold building materials and infill soil. Building materials and soil would be delivered by haul trucks. Unlike the 2007 RSP, the proposed RSPU would include the construction of a major medical center and a sports and entertainment stadium. Construction of new land uses pursuant to the RSPU is assumed to begin in 2016 and last at least two decades. For the purposes of analysis, this SEIR has assumed construction over a period of approximately 19 years, with buildout completed in 2035, but the actual period of construction would depend on market conditions. Construction of individual residences and commercial buildings under the RSPU would likely occur incrementally, as dictated by the market, the same as was assumed for the 2007 RSP.

The RSPU construction activities that would generate the highest noise levels would involve impact pile driving that occurs during foundation construction. Foundations of large, tall buildings frequently require the installation of deep foundations supported by piles in order to bear the weight of the building and to protect the building against uplift that can be created by shallow groundwater. Construction within the RSP Area that may require impact pile driving would include the proposed KP Medical Center, MLS Stadium, and additional future mid- and high-rise structures constructed pursuant to the RSPU. The nearest existing sensitive receptors to the RSP Area (proximate to Blocks 49 and 50) are the Creamery at Alkali Flat, the Lofts at Globe Mills, and numerous single- and multi-family residences in the Alkali Flat neighborhood, especially those located along D Street, located approximately 130 feet to 300 feet south of the RSPU's southern boundary. As described above, because of the unusual circumstance related to the noise sensitivity of the KCRA studio broadcasting activities, it is treated as a sensitive receptor in this analysis.

As shown in Table 4.10-10, impact pile drivers can generate noise levels of approximately 88 dBA $L_{eq}$/95 dBA $L_{max}$ from a distance of 50 feet. Assuming an attenuation rate of 7.5 dB per doubling of distance, the KCRA studio, the single-family residences, and the multi-family residences south of the RSPU site would be exposed to noise levels of approximately 78 dBA $L_{eq}$/ 85 dBA $L_{max}$, 78 dBA dBA $L_{eq}$/85 Lmax, and 69 dBA $L_{eq}$/76 dBA $L_{max}$, respectively.

The KCRA Studio is located within 80 feet of the centerline of the UPRR rail line and is already exposed to frequent freight and commuter train pass-bys. According the FTA, a single train pass-by at a speed of 20 miles per hour (mph) can generate a maximum noise level of 83 dBA $L_{max}$ from a distance of 80 feet.[21] The maximum noise level generated during impact pile driving from a distance of 130 feet is approximately 2 dB louder than noise generate from a single train pass-by from a distance of 80 feet, which would not result in a noticeable increase in noise levels. However, since the KCRA building currently conducts live broadcasting eleven hours out of the day, the combination of noise generated by impact pile driving within the RSP Area and heavy freight pass-bys could result in a noticeable change in the daytime noise levels that could be disruptive to studio activities.

During the building erection phase, construction activities that would generate high noise levels would involve the use of pneumatic tools, which can generate noise levels as high as 82 dBA $L_{eq}$/ 85 dBA $L_{max}$ from a distance of 50 feet (see Table 4.10-10). Assuming an attenuation rate of 7.5 dB per doubling of distance, the KCRA studio, Creamery, Globe Mills and single- and multi-family residences along D Street would be exposed to noise levels of approximately 72 dBA $L_{eq}$/ 75 dBA $L_{max}$, 72 dBA $L_{eq}$/75 dBA $L_{max}$, and 63 dBA $L_{eq}$/66 dBA $L_{max}$, respectively.

As the RSPU is incrementally developed over time, future residential buildings constructed in earlier phases of construction could be occupied and could be exposed to construction noise from subsequent construction phases. These future RSP Area residences could be located within 50 feet of onsite construction activities. From a distance of 50 feet, future residential receptors could be exposed to noise levels as high as 88 dBA $L_{eq}$/95 dBA $L_{max}$ during impact pile driving or 82 dBA $L_{eq}$/85 dBA $L_{max}$ from the use of pneumatic tools. Although future ambient noise levels would be higher compared than existing conditions (e.g., increase in traffic noise), the noise levels during construction could result in an annoyance for future RSP Area sensitive receptors.

As described above, construction noise associated with development of within the RSP Area, pursuant to the proposed RSPU, would be noticeable at sensitive receptors in the area. Daytime excavation and construction activities would generate noise that could disturb people living in the surrounding residential uses or working at nearby sensitive uses such as the KCRA studio, making it difficult to concentrate, potentially harming hearing and/or disrupting work activities. Nighttime excavation and/or construction could result in sleep disturbance of the nearby sensitive residential receptors or work disruption during evening broadcasts at KCRA.

Construction activities would expose occupants of nearby buildings to high levels of noise during the day and night. Although mitigation measures specified below would reduce construction noise impacts and would eliminate any potential harm to hearing, surrounding residents and businesses could be annoyed by noise associated with construction activities at the project site. Therefore, this would be considered a **short-term significant impact**. This impact conclusion is consistent with the 2007 RSP EIR.

[21] Federal Transit Administration, 2006. Transit Noise and Vibration Assessment. May, 2006. p. F-2.

#### Railyards Specific Plan Update Land Use Variant

Construction of the RSPU Land Use Variant would have the identical construction noise effects as those discussed for the RSPU, above. Under the Land Use Variant, the KP Medical Center and MLS Stadium would not be developed and would be replaced with office and residential land uses. The construction of the RSPU Land Use Variant would utilize very similar construction equipment, phasing, and durations as those discussed for the RSPU. Existing and future proposed sensitive land uses would be exposed to construction noise that could result in an annoyance. Therefore, construction noise would be considered to result in a **short-term potentially significant impact**.

### *KP Medical Center*

The proposed KP Medical Center is assumed to be constructed in two phases. The first phase would be comprised of the construction of a 658,000-square foot (sf) new hospital building, an adjacent 210,000 sf hospital support building (HSB), and a parking structure to provide hospital staff, patients, families, and visitors with 1,500 parking spaces. In addition, a 60,000 sf Central Utility Plant (CUP) and a helistop for use in the transport of patients would be constructed during the first phase. The second phase would include the construction of two multi-story medical office buildings, a multi-story parking garage, commissioning of shelled floors in the hospital tower, and minor changes to the interior of the CUP in order to provide energy to the phase 2 buildings. It is assumed that there would be no expansion in overall space at the CUP and no change to the footprint of the structure. Phase 1 construction is anticipated to begin in 2018 and be open to the public in 2022. Phase 2 is expected to be initiated no sooner than approximately 10 years after completion of Phase 1.

The nearest sensitive receptors to the KP Medical Center site are single-family residences located south of the intersection of Bannon Street and North B Street (approximately 560 feet northeast of the KP Medical Center site).

As shown in Table 4.10-10, although final site plans and building designs have not yet been prepared, it is assumed that the loudest construction equipment that may be used during building construction would be impact pile driving, which could generate noise levels up to 88 dBA $L_{eq}$/ 95 dBA $L_{max}$ from a distance of 50 feet. Assuming an attenuation rate of 7.5 dB per doubling of distance, during building construction activities the nearest sensitive receptors located within 560 feet northeast of the KP Medical Center site could be exposed to a noise level of approximately 62 dBA $L_{eq}$/69 dBA $L_{max}$.

In addition, as noted above for the proposed RSPU, by the time construction begins, future residential uses could be present in the nearby R-5-SPD zone as well as in mixed-use projects developed in the C-3-SPD zone south of Railyards Boulevard (assumed on Block 4). Assuming impact pile driving at the KP Medical Center site, residential uses on the east side of 5$^{th}$ Street could be exposed to noise levels of up to 83 dBA $L_{eq}$/90 dBA $L_{max}$, and residential uses south of Railyards could be exposed to noise levels of up to 80 dBA Leq/87 dBA $L_{max}$.

Like the impacts discussed above for the proposed RSPU, onsite construction activities of the proposed KP Medical Center would result in noise levels that could adversely affect existing and future sensitive land uses. Therefore, construction noise is considered to be a **short-term potentially significant impact**.

### *MLS Stadium*

The construction of the proposed MLS Stadium and related plazas and open spaces would occur over an approximately 18-month period. The timing of construction would be tied to the awarding of a team to Sacramento by Major League Soccer. Depending on the timing of this event, construction could start as early as late 2016 and conclude as early as winter 2018. Depending on the final engineering of the Stadium foundations, impact pile driving may be used to support the Stadium foundations and footings. The nearest sensitive receptors to the Stadium site are located south of the UPRR tracks, and include multi-family residences at the Lofts at Globe Mills located south of the intersection of 11$^{th}$ Street and C Street (approximately 550 feet southeast of the Stadium site) and single- and multi-family residences located south of the intersection of 8$^{th}$ Street and D Street (approximately 840 feet southwest of the Stadium site). In addition, south of the UPRR tracks there are residences under construction at The Creamery at Alkali Flat project, approximately 350 feet from the Stadium site. All of these properties are currently exposed to rail noise on a periodic basis throughout the day.

In the future, approximately 680 residential units may be built and occupied on Blocks 56 and 69, west of the Stadium site between 8$^{th}$ and 7$^{th}$ streets. These units may be as close as 70 feet to the Stadium site (8$^{th}$ Street is planned to have a right-of-way width of 68 feet). If the Stadium were constructed after residences are occupied on these blocks, exterior noise levels at the residential property line could be as high as 85 dBA $L_{eq}$/91 dBA $L_{max}$ during pile driving and 78 dBA $L_{eq}$/81 $L_{max}$ during building erection construction phases.

As shown in Table 4.10-10, the loudest construction equipment that would be used during building construction could be impact pile drivers, which would generate noise levels up to 88 dBA $L_{eq}$/95 dBA $L_{max}$ from a distance of 50 feet. Assuming an attenuation rate of 7.5 dB per doubling of distance, the nearest sensitive receptor (KCRA Studio) located within 500 feet from the proposed MLS Stadium site during building construction activities could be exposed to a noise level of approximately 63 dBA $L_{eq}$/70 dBA $L_{max}$. The KCRA Studio is located about 80 feet south of the centerline of the UPRR rail line and is already exposed to frequent freight and commuter train pass-bys. According the FTA, a single train pass-by at a speed of 20 miles per hour (mph) can generate a maximum noise level of 83 dBA $L_{max}$ from a distance of 80 feet,[22] which is higher than the noise generated during impact pile driving from a distance of 500 feet. However, since the KCRA building currently conducts live broadcasting eleven hours out of the day Monday through Friday, the combination of noise generated by onsite impact pile driving and

[22] Federal Transit Administration, 2006. Transit Noise and Vibration Assessment. May, 2006. p. F-2.

heavy freight pass-bys could result in a noticeable change in daytime noise levels that could be disruptive to studio activities.

Construction of the MLS Stadium would result in the same impacts as those discussed under the RSPU. Onsite construction activities would result in noise levels that could cause existing and future sensitive land uses near the MLS Stadium to be annoyed. Therefore, construction noise is considered to be a **short-term potentially significant impact**.

### *Stormwater Outfall*

The proposed Stormwater Outfall would be located on the western side of the RSP Area, under and adjacent to the I-5 viaduct and immediately south of Railyards Boulevard. The Stormwater Outfall would be constructed on a 0.17-acre site and would consist of a pump station structure, most of which would be located underground, and a concrete outfall structure on the east bank of the Sacramento River. Construction of the Stormwater Outfall would be expected to last approximately six months, and would likely include the use of an excavator, bulldozer, and concrete and haul trucks.

The nearest sensitive receptors to the Stormwater Outfall site are residences near the intersection of C/3rd Streets in West Sacramento, approximately 1,600 feet west of the Stormwater Outfall site across the Sacramento River, and the Best Western Sandman Motel located southeast of the intersection of Jibboom Street and Richards Boulevard, approximately 1,850 feet north of the Stormwater Outfall site.

The loudest construction equipment that would be used during construction of the Stormwater Outfall would be from the impact pile driver that would be used to drive in sheet piles for the cofferdam. Impact pile drivers can generate noise levels up to 88 dBA $L_{eq}$/95 dBA $L_{max}$ from a distance of 50 feet (see Table 4.10-10). Assuming an attenuation rate of 7.5 dB per doubling of distance, the nearest sensitive receptors to the intersection of C/3rd Streets in West Sacramento, approximately 1,600 feet west of the Stormwater Outfall across the Sacramento River could be exposed to noise levels up to 50 dBA $L_{eq}$/57 dBA $L_{max}$ during impact pile driving activities. Since construction activities at the Stormwater Outfall would be just under the I-5 viaduct, construction noise at the nearest sensitive land use may not be distinguishable from existing I-5 traffic noise. This would result in a **less-than-significant impact.**

### *Summary*

Construction of the proposed Stormwater Outfall would require the use of an impact pile driver during cofferdam construction. However, the noise generated by the impact pile driver would be infrequent and would not likely be audible at the nearest sensitive receptors due to existing traffic noise in the area from I-5. Mitigation is not recommended for this less-than-significant impact.

The construction activities associated with the proposed RSPU, RSPU Land Use Variant, KP Medical Center, and MLS Stadium could require the use of impact pile drivers during building construction. Impact pile driving would be temporary and intermittent. Since construction

activities could occur outside of the City of Sacramento's construction exempt hours, construction noise levels could result in an annoyance at nearby existing offsite and future onsite sensitive land uses. This would result in a **short-term potentially significant impact.** Therefore, Mitigation Measure 4.10-1 is recommended.

Mitigation Measure

Mitigation Measure 4.10-1 described below is the same as Mitigation Measure 6.8-1 on pages 6.8-17 and 6.8-18 of the 2007 RSP EIR.

**Mitigation Measure 4.10-1 (RSPU, KPMC, MLS)**

*The contractor shall ensure that the following measures are implemented during all phases of project construction:*

*a) Whenever construction occurs within 130 feet to occupied residences (on or offsite), temporary barriers shall be constructed around the construction sites to shield the ground floor of the noise-sensitive uses. These barriers shall be of ¾-inch Medium Density Overlay (MDO) plywood sheeting, or other material of equivalent utility and appearance, and shall achieve a Sound Transmission Class of STC-30, or greater, based on certified sound transmission loss data taken according to ASTM Test Method E90 or as approved by the City of Sacramento Building Official.*

*b) Construction equipment staging areas shall be located as far as feasible from residential areas while still serving the needs of construction contractors.*

*c) Use of auger displacement for installation of foundation piles, if feasible. If impact pile driving is required, sonic pile drivers shall be used, unless engineering studies are submitted to the City that show this is not feasible, based on geotechnical considerations.*

*d) Prior to impact pile driving activities in Blocks 49, 50 and 52, the applicant shall coordinate with the KCRA building management staff in order to minimize disruption from pile driving, to the extent feasible.*

**Impact Significance After Mitigation:** Implementation of **Mitigation Measure 4.10-1** would reduce construction noise at the proposed project sites to the extent feasible. Restricting heavy-duty equipment operations in close proximity to buildings would substantially reduce exterior and interior noise at adjacent buildings. Use of auger displacement would reduce noise levels of pile installation to be comparable to the existing noise levels of passing trains. If auger displacement is not feasible, use of sonic pile drivers would reduce noise levels by about 5dBA compared to impact pile drivers. These measures would minimize interior noise and associated sleep disturbance and any potential hearing loss effects at nearby receptors during excavation, and construction. However, even with implementation of these mitigation measures, it is likely that

construction activities would result in increased levels of annoyance, interruption of conversation, and potential sleep disturbance at surrounding receptors during the day and occasionally at night. This impact would be considered **significant and unavoidable** during the short-term duration of construction activities on the proposed project sites.

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**Impact 4.10-2: Operations of the proposed projects could result in a substantial permanent increase in ambient exterior noise levels in the project vicinity.**

The 2007 RSP EIR discussed transportation noise impacts under Impact 6.8-2 on pages 6.8-18 through 6.8-21, and concluded that within the RSP Area there would be no significant noise impacts related to vehicular traffic and UPRR train pass-by events. The 2007 RSP EIR stated that the RSP would increase traffic volumes along local streets that would substantially increase traffic noise in the project vicinity, but found these increases in traffic noise would not result in a significant impact. The 2007 RSP EIR assessed rail traffic noise impacts at the proposed Depot District, Central Shops District, West End District, East End District, and Riverfront District and found some of these districts to be expose to rail noise above 70 dBA $L_{dn}$. In summary, the 2007 RSP EIR concluded that because the proposed residential buildings in every district would be constructed to meet Title 24 standards for interior noise levels, there would not be a significant impact due to increased ambient noise. In regards to noise impacts in the vicinity of the 2007 RSP, the 2007 RSP EIR assessed noise impacts related to the project's contribution to traffic to local streets and the proposed realignment of the existing rail line.

As discussed in the *Methods and Assumptions* discussion in Section 4.10.3, the California Supreme Court has recently held that CEQA does not require an EIR to consider effects of the existing environment on the future project, including such effects as exposure of future residents to existing train noise. Impact 6.8-2 of the 2007 RSP EIR addressed these types of impacts in the context of the provisions of the RSP that proposed to alter the alignment of the UPRR line. As of today, the UPRR line has been realigned, and is not proposed for any further alteration; thus, the noise generated by trains on the UPRR line is considered part of the existing environment. Although no longer required by CEQA, noise impacts related to rail and freight pass-bys along the RT and UPRR rail lines are addressed here to demonstrate how the effects of the RSPU would compare to the 2007 RSP.

Impact 6.8-3 on page 6.8-22 of the 2007 RSP EIR found that the 2007 RSP would introduce new stationary sources such as heating, ventilation and air conditioning (HVAC) equipment, garbage pickup activity, and service and delivery truck activity at residential and commercial building loading docks. Due to the high potential for stationary sources to exceed the City's noise standards, the 2007 RSP EIR concluded that new stationary sources would result in a significant noise impact.

## *Railyards Specific Plan Update*

### On-Road Transportation

The RSPU's future contribution to local roadway segments would be different than those analyzed under the 2007 RSP EIR. This is due to the changes in land use designations compare to the 2007 RSP and the RSPU, which resulted in a change in trip generation rates. Vehicles traveling to and from the RSPU would create traffic noise. These additional vehicle trips would result in higher noise levels along the downtown street network. Noise level projections were made using the FHWA Noise Prediction Model for those road segments that would experience the greatest increase in traffic volumes and that are in proximity to sensitive receptors. The model is based on the Calveno reference noise factors for automobiles, medium trucks, and heavy trucks, with consideration given to vehicle volume and speed. The segments analyzed and results of the modeling are shown in **Table 4.10-11**.

Baseline Conditions and Baseline plus Project (i.e., RSPU). As shown in Table 4.10-11, the only roadway segment analyzed that would result in traffic noise levels that would exceed the normally acceptable $L_{dn}$ threshold for Urban Residential Infill and Mixed-Use Projects would be along 12th Street, between 16th Street and Sunbeam Avenue. There are no existing or proposed residential land uses along this segment of roadway.

Although the on-road traffic noise associated with the RSPU would not result in noise levels that would exceed the normally acceptable Ldn for Urban Residential Infill and Mixed-Use Projects listed in Table 4.10-11, the RSPU would result in daily Ldn noise exposure that would exceed the allowable noise incremental increases detailed in Table 4.10-11 at existing residential uses. The roadway segments found to result in traffic noise increases that exceed those shown in Table 4.10-9 are Sequoia Pacific Boulevard, Bercut Drive, Railyards Boulevard, 10th Street, 7th Street, 5th Street, 6th Street, G Street, H Street and F Street. Of these intersections, the roadway segments that would be adjacent to an existing residential land uses are 7th Street, between Railyards Boulevard and F Street, and F Street, between 7th Street and 8th Street. Although the on-road traffic noise associated with the RSPU would not result in noise levels that would exceed the normally acceptable $L_{dn}$ for Urban Residential Infill and Mixed-Use Projects listed in Table 4.10-11, the RSPU would result in daily Ldn noise exposure that would exceed the allowable noise incremental increases detailed in Table 4.10-11 at residential uses. This would result in a **significant impact**.

### Rail/Light Rail Transport

The RSP Area is bisected by existing UPRR rail tracks and a Sacramento RT light rail line. Train traffic along these rail lines has the potential to generate noise levels that could exceed the City's exterior noise standards. As previously discussed, General Plan Policy EC 3.1.1 requires that indoor and outdoor areas of new projects be constructed such that they are not exposed to noise levels that exceed the City's noise standards. Therefore, an impact would be considered significant if new sensitive receptors would be exposed to transportation-related noise levels above the City's compatibility standard for urban residential infill and mixed-use projects of 70 dBA $L_{dn}$, as shown in Table 4.10-8.

**TABLE 4.10-11.**
**BASELINE AND PROJECTED $L_{dn}$ TRAFFIC NOISE LEVELS ALONG STREETS IN THE MLS STADIUM VICINITY**

| | Traffic Noise Level, dBA, $L_{dn}$[1] | | | | | |
|---|---|---|---|---|---|---|
| **Roadway Segment** | **Baseline** | **Baseline + RSPU** | **Incremental Increase** | **Incremental Increase Significance Threshold[2]** | **Significant? (Yes or No)[2]** | **Exceed 70 dBA?** |
| Richards Boulevard | | | | | | |
| between Bercut Drive and N 3rd Street | 66 | 66 | 0 | 1 | No | No |
| between N 3rd Street and Sequoia Pacific Boulevard | 66 | 66 | 0 | 1 | No | No |
| between Sequoia Pacific Boulevard and N 5th Street. | 66 | 65 | -1 | 1 | No | No |
| between north 5th Street and N 7th Street | 66 | 65 | -1 | 1 | No | No |
| between N 7th Street and N 10th Street | 67 | 66 | -1 | 1 | No | No |
| between N 10th Street and Dos Rios Street | 66 | 67 | 1 | 1 | No | No |
| between Dos Rios Street and N 12th Street | 66 | 67 | 1 | 1 | No | No |
| 12th Street | | | | | | |
| between 16th Street and Sunbeam Avenue | 70 | 71 | 1 | 1 | No | **Yes** |
| between Sunbeam Avenue and Dos Rios Street | 67 | 67 | 0 | 1 | No | No |
| between N B Street and E Street | 65 | 66 | 1 | 1 | No | No |
| between E Street and F Street | 65 | 65 | 0 | 1 | No | No |
| Dos Rios Street | | | | | | |
| between Richards Boulevard and N 12th Street | 54 | 58 | 4 | 5 | No | No |
| B Street | | | | | | |
| between Dos Rios Street and 7th Street | 59 | 61 | 2 | 3 | No | No |
| west of 7th Street | 59 | 60 | 1 | 3 | No | No |
| Bannon Street | | | | | | |
| between Sequoia Pacific Boulevard and Bercut Drive | 57 | 57 | 0 | 3 | No | No |
| Sequoia Pacific Boulevard | | | | | | |
| between Richards Boulevard and Bannon Street | 52 | 58 | 6 | 5 | **Yes** | No |
| south of Bannon Street | 58 | 61 | 3 | 3 | No | No |
| Bercut Drive | | | | | | |
| between Bannon Street and South Park Street | 46 | 62 | 16 | 8 | **Yes** | No |
| between South Park Street and Railyards Boulevard | NA | 62 | NA | NA | NA | No |
| between Railyards Boulevard and Camille Lane | NA | 58 | NA | NA | NA | No |
| South Park Street | | | | | | |
| between Bercut Drive and 5th Street | NA | 63 | NA | NA | NA | No |
| between 5th street and Judah Street | NA | 60 | NA | NA | NA | No |
| between Judah Street and 6th Street | NA | 60 | NA | NA | NA | No |
| between 6th Street and 7th Street | NA | 61 | NA | NA | NA | No |

**TABLE 4.10-11.**
**BASELINE AND PROJECTED $L_{dn}$ TRAFFIC NOISE LEVELS ALONG STREETS IN THE MLS STADIUM VICINITY**

| | Traffic Noise Level, dBA, $L_{dn}$[1] | | | | | |
|---|---|---|---|---|---|---|
| **Roadway Segment** | **Baseline** | **Baseline + RSPU** | **Incremental Increase** | **Incremental Increase Significance Threshold[2]** | **Significant? (Yes or No)[2]** | **Exceed 70 dBA?** |
| Jibboom Street | | | | | | |
| between I-5 and Railyards Boulevard | 63 | 62 | -1 | 2 | No | No |
| between Railyard Boulevard and I Street | 64 | NA | NA | 2 | NA | NA |
| Railyards Boulevard | | | | | | |
| between Jibboom Street and Bercut Drive | 62 | 64 | 2 | 2 | No | No |
| between Bercut Drive and KP Medical Center Drop-off | 62 | 64 | 2 | 2 | No | No |
| between KP Medical Center Drop-off and Entry | 62 | 65 | 3 | 2 | **Yes** | No |
| between KP Medical Center Entry and 5th Street | 62 | 65 | 3 | 2 | **Yes** | No |
| between 5th Street and Judah Street | 63 | 65 | 2 | 2 | No | No |
| between Judah Street and 6th Street | 63 | 65 | 2 | 2 | No | No |
| between 6th Street and 7th Street | 63 | 66 | 3 | 2 | **Yes** | No |
| between 7th Street and 8th Street | NA | 65 | NA | NA | NA | No |
| between 8th street and 10th Street | NA | 64 | NA | NA | NA | No |
| 10th Street | | | | | | |
| between Railyards Boulevard and B Street | NA | 59 | NA | NA | NA | No |
| between B Street and Richards Boulevard | 54 | 60 | 6 | 5 | **Yes** | No |
| north of Richards Boulevard | 57 | 57 | 0 | 3 | No | No |
| 7th Street | | | | | | |
| north of Richards Boulevard | 56 | 56 | 0 | 3 | No | No |
| between Richards Boulevard and B Street | 61 | 61 | 0 | 2 | No | No |
| between B Street and South Park Street | 64 | 62 | -2 | 2 | No | No |
| between South Park Street and Railyards Blvd | 64 | 60 | -4 | 2 | No | No |
| between Railyards Blvd and F Street | 61 | 65 | 4 | 2 | **Yes** | No |
| between F St and G Street | 61 | 62 | 1 | 2 | No | No |
| between G Street and H Street | 59 | 64 | 5 | 3 | **Yes** | No |
| between H Street and I Street | 57 | 61 | 4 | 3 | **Yes** | No |
| between I Street and J Street | 57 | 61 | 4 | 3 | **Yes** | No |
| 8th Street | | | | | | |
| between B Street and Railyards Boulevard | NA | 59 | NA | NA | NA | No |
| north of F Street | 55 | 57 | 2 | 3 | No | No |
| between F Street and H Street | 60 | 62 | 2 | 2 | No | No |
| between H Street and I Street | 59 | 61 | 2 | 3 | No | No |
| south of I Street | 60 | 62 | 2 | 2 | No | No |

**TABLE 4.10-11.**
**BASELINE AND PROJECTED $L_{dn}$ TRAFFIC NOISE LEVELS ALONG STREETS IN THE MLS STADIUM VICINITY**

| | Traffic Noise Level, dBA, $L_{dn}$[1] | | | | | |
|---|---|---|---|---|---|---|
| **Roadway Segment** | **Baseline** | **Baseline + RSPU** | **Incremental Increase** | **Incremental Increase Significance Threshold[2]** | **Significant? (Yes or No)[2]** | **Exceed 70 dBA?** |
| 5th Street | | | | | | |
| between B Street and South Park Street | NA | 60 | NA | NA | NA | No |
| between South Park Street and Railyards Boulevard | NA | 62 | NA | NA | NA | No |
| between Railyards Boulevard and Camille Lane | 52 | 64 | 12 | 5 | **Yes** | No |
| between Camille Lane and Stevens Street | 52 | 64 | 12 | 5 | **Yes** | No |
| between Stevens Street and H Street | 62 | 66 | 4 | 2 | **Yes** | No |
| between H Street and I Street | 62 | 65 | 3 | 2 | **Yes** | No |
| between I Street and J Street | 60 | 62 | 2 | 2 | No | No |
| south of J Street | 59 | 61 | 2 | 3 | No | No |
| Camille Lane | | | | | | |
| between Bercut Drive and HSB Drop Off | NA | 61 | NA | NA | NA | No |
| between HSB Drop Off and HSB Entry | NA | 63 | NA | NA | NA | No |
| between HSB Entry and 5th Street | NA | 63 | NA | NA | NA | No |
| between 5th Street and 6th Street | NA | 63 | NA | NA | NA | No |
| 6th Street | | | | | | |
| between B Street and South Park Street | NA | 60 | NA | NA | NA | No |
| between South Park Street and Railyards Boulevard | NA | 62 | NA | NA | NA | No |
| between Railyards Boulevard and Camille Lane | 57 | 63 | 6 | 3 | **Yes** | No |
| between Camille Lane and Stevens Street | 57 | 64 | 7 | 3 | **Yes** | No |
| between Stevens Street and H Street | 59 | 65 | 6 | 3 | **Yes** | No |
| between H Street and I Street | 58 | 62 | 4 | 3 | **Yes** | No |
| south of I Street | 57 | 61 | 4 | 3 | **Yes** | No |
| G Street | | | | | | |
| east of 7th Street | 59 | 62 | 3 | 3 | No | No |
| west of 7th Street | 60 | 63 | 3 | 2 | **Yes** | No |
| H Street | | | | | | |
| between 5th Street and 6th Street | 58 | 58 | 0 | 3 | No | No |
| between 6th Street and 7th Street | 58 | 60 | 2 | 3 | No | No |
| between 7th Street and 8th Street | 59 | 61 | 2 | 3 | No | No |
| east of 8th Street | 57 | 61 | 4 | 3 | **Yes** | No |

**TABLE 4.10-11.**
**BASELINE AND PROJECTED $L_{dn}$ TRAFFIC NOISE LEVELS ALONG STREETS IN THE MLS STADIUM VICINITY**

| | Traffic Noise Level, dBA, $L_{dn}$[1] | | | | | |
|---|---|---|---|---|---|---|
| **Roadway Segment** | **Baseline** | **Baseline + RSPU** | **Incremental Increase** | **Incremental Increase Significance Threshold[2]** | **Significant? (Yes or No)[2]** | **Exceed 70 dBA?** |
| I Street | | | | | | |
| west of 5th Street (Yolo County) | 59 | 59 | 0 | 3 | No | No |
| between 5th Street (Yolo County) and 3rd Street (Yolo County) | 61 | 59 | -2 | 2 | No | No |
| between 3rd Street (Yolo County) and Jibboom Street | 62 | 60 | -2 | 2 | No | No |
| between Jibboom Street and 5th Street | 63 | 65 | 2 | 2 | No | No |
| between 5th Street and 6th Street | 62 | 63 | 1 | 2 | No | No |
| between 6th Street and 7th Street | 62 | 62 | 0 | 2 | No | No |
| between 7th Street and 8th Street | 62 | 62 | 0 | 2 | No | No |
| east of 8th Street | 61 | 62 | 1 | 2 | No | No |
| J Street | | | | | | |
| between 3rd Street and 5th Street | 65 | 66 | 1 | 1 | No | No |
| between 5th Street and 7th Street | 64 | 65 | 1 | 2 | No | No |
| east of 7th Street | 64 | 64 | 0 | 2 | No | No |
| F Street | | | | | | |
| between 7th Street and 8th Street | 58 | 62 | 4 | 3 | **Yes** | No |
| between 8th Street and 12th Street | 58 | 61 | 3 | 3 | No | No |
| east of 12th Street | 59 | 61 | 2 | 3 | No | No |
| Tower Bridge Gateway | | | | | | |
| west of 5th Street (Yolo county) | 63 | 63 | 0 | 2 | No | No |
| between 5th Street (Yolo County) and South River Road | 63 | 64 | 1 | 2 | No | No |
| east of S River Road | 64 | 65 | 1 | 2 | No | No |

NOTES:

1. Noise levels were determined using FHWA Traffic Noise Prediction Model (FHWA RD-77-108).
2. Traffic noise increases at an existing sensitive use exceed the allowed incremental noise increase provided in Table 4.10-9 would result in a significant impact.
3. Future residences that are exposed to future traffic noise above the allowed City of Sacramento of 70 dBA $L_{dn}$ for an infill site would result in a significant impact.

NA = New roadway

Source: ESA, 2016

The results of the $L_{dn}$ modeling effort (see Appendix I) are summarized in Table4.10-11 for Under the proposed RSPU, land uses located near the Sacramento RT rail line along 7th Street, between F Street and North B Street, would be exposed to noise levels that would not exceed the City of Sacramento's noise standards. Based on the RT Green Line schedule, it was determined that the RT operates 19 hours a day and approximately 59 train pass-bys occur per day along 7th Street, which equates to approximately 3 train pass-bys per hour.[23] According to the FTA's Guidance Manual for Transit Noise and Vibration Impact Assessment, the typical Sound Exposure Level (SEL) from a rail transit pass-by is 82 dB at a reference distance of 50 feet.[24] The effect of light rail train noise levels, in terms of $L_{dn}$ at a distance of 50 feet, were computed using rail noise prediction equations found in the FTA's *Guidance Manual for Transit Noise and Vibration Impact Assessment*. The combined rail noise generated by light rail traffic along the RT Green Line would be about 57 dBA $L_{dn}$ from a distance of 50 feet from the center of the rail tracks. According to the Sacramento Regional Transit, the rail speed north of the Railyards Boulevard along the RT Green Line is limited to 10 mph.[25] Using the train speed adjusted found in the FTA's *Guidance Manual for Transit Noise and Vibration Impact Assessment*,[26] the combined rail noise generated by light rail traffic along the RT Green Line would be about 43 dBA $L_{dn}$ from a distance of 50 feet from the center of the rail tracks. There are proposed residences located in Blocks 69 and 56 that could be as close as 30 feet from the centerline of the RT line. From this distance, these residential units would be exposed to rail noise of approximately 46 dBA $L_{dn}$, which is less than the City's noise standard of 70 dBA $L_{dn}$. Therefore, this impact would be considered **less than significant**. This impact conclusion is consistent with 2007 RSP EIR.

The UPRR rail line services freight and commuter traffic which transverses through the southern portion of the RSP Area. The UPRR rail line is located directly south of the planned central shops district and MLS Stadium, as well as blocks that are proposed to include mixed-use development, including residential uses. As shown in Figure 4.10-1 and Table 4.10-6, a 48-hour long-term noise measurement (LT-2) was conducted near the proposed MLS Stadium site within line-of-site of the UPRR rail line. The noise measurement results from location LT-2 range between 58 dBA to 60 dBA $L_{dn}$ (see Table 4.10-6). The dominant sources of noise measured at LT-2 include traffic along 7th Street, and train traffic along the UPRR and Sacramento RT rail lines.

For this analysis, given that vehicular traffic along 7th Street and train traffic along the Sacramento RT Green Line is relatively low, it is conservatively assumed that noise levels at LT-2 are representative of freight and passenger rail traffic along the UPRR rail line. Assuming a drop off rate of 4.5 dB per doubling of distance and a reference noise level of 60 dBA $L_{dn}$ from a distance of 463 feet, sensitive land uses located within 190 feet of the center line of the UPRR rail

23 Sacramento Regional Transit, 2015. RT Bus & Light Rail Routes & Schedules. Available: http://www.sacrt.com/schedules/current/routes.stm. Accessed on December 10, 2015.

24 Federal Transit Administration, 2006. Transit Noise and Vibration Impact Assessment. May 2006. p. 5-5.

25 "Question about Green Line Speeds." Message to Vern Barnhart. 5 Apr. 2016. E-mail.

26 Federal Transit Administration, 2006. Transit Noise and Vibration Impact Assessment. May 2006. pp. 10-9.

tracks would be exposed to train traffic noise that would exceed the City of Sacramento noise standard of 70 dBA $L_{dn}$. In the future, there would be residential units may be built and occupied on Blocks 50, 49 and 35, located south of the proposed Stadium and west of I-5. These residential units may be close as 190 feet from the centerline of the UPRR rail line and could be exposed rail noise exceeding the City of Sacramento exterior noise standard of 70 dBA $L_{dn}$. This would result in a **significant impact.**

### Non-Transportation Noise Sources

#### *Heating, Ventilation, and Air-Conditioning Systems*

The HVAC systems for maintaining comfortable temperatures buildings proposed under the RSPU would consist largely of packaged air conditioning systems. The precise locations of HVAC systems are unknown at this time. Possible HVAC system locations would include street level and rooftops. HVAC units can generate noise levels of approximately 51 dBA $L_{eq}$ at a reference distance of 100 feet from the operating units during maximum heating or air conditioning operations.[27]

Sensitive land uses located within approximately 110 feet of these HVAC units could be exposed to noise levels above the City of Sacramento's nighttime noise standard of 50 dBA $L_{eq}$. HVAC units within the RSP Area could possibly be as close as 300 feet from the nearest existing offsite sensitive land use (residence located near the intersection of D and E streets). At this distance, the offsite sensitive land use would not be exposed to noise levels above the applied City of Sacramento's nighttime noise standard.

Future noise sensitive land uses (new residences) could potentially be placed within 110 feet from the major medical center or other commercial buildings where HVAC units would be used. These sensitive land uses within the RSP Area could be exposed to HVAC noise levels that would exceed the City's daytime (55 dBA from 7:00 am to 10:00 pm) or nighttime (50 dBA from 10:00 pm to 7:00 am) Noise Control Ordinance standards. This impact would be **potentially significant**. This impact conclusion is consistent with 2007 RSP EIR.

#### *Central Utility Plant*

The proposed KP Medical Center would include a CUP structure that would provide the steam, heating hot water, and chilled water for cooling to all buildings on campus. The primary sources of noise generated within the CUP building would be from the boilers and emergency backup generators. Although the noise generated by the boiler and emergency backup generators could result in a substantial noise from within the CUP building, but because these sources would be completely enclosed, the exterior noise levels outside of the CUP build is not expected to result in a substantial noise increase at nearby existing or proposed land uses. Therefore, this impact would result in a **less than significant impact**.

[27] Puron, 2005. *48PG03-28 Product Data*. p. 10 – 11.

### *Loading Docks*

Future residential and non-residential uses proposed within the RSP Area could require loading docks. Truck deliveries at loading docks generate noise as a result of truck arrivals and departures from the unloading area, trucks backing into the docks (including backup beepers), air brakes, and other truck unloading-related noise. These activities would be a source of elevated noise levels at nearby sensitive receptors. Noise levels of 80 dBA $L_{max}$ and 60 dBA $L_{eq}$ at a distance of 50 feet can be generated during loading dock activities.[28]

Sensitive land uses located within approximately 120 feet of a loading dock would be exposed to noise levels above the applied City of Sacramento's nighttime noise standard of 50 dBA $L_{eq}$. Loading docks could possibly be as close as 300 feet from the nearest existing offsite sensitive land use (residence located near the intersection of D and E streets). At this distance, offsite sensitive land uses would not be exposed to levels above the City of Sacramento's nighttime noise standard. However, noise sensitive land uses (new residences) built within the RSP Area pursuant to the proposed RSPU could potentially be placed within 150 feet from buildings where loading docks may be used. These sensitive land uses could be exposed to loading dock noise levels that would exceed the City's daytime (55 dBA from 7:00 am to 10:00 pm) and nighttime (50 dBA from 10:00 pm to 7:00 am) Noise Control Ordinance standards. This impact would be **potentially significant**. This impact conclusion is consistent with 2007 RSP EIR.

## Railyards Specific Plan Update Land Use Variant

### On-Road Transportation

Under the RSPU Land Use Variant, the potential for adverse intersection impacts would be similar to those discussed above for the proposed RSPU. This is because the RSPU Land Use Variant would generate an equivalent amount of AM peak hour traffic, but 14 percent more PM peak hour traffic when compared to the RSPU. In addition, the RSPU Land Use Variant would not include the MLS Stadium, which would result in no pre-event peak hour traffic. Since the RSPU Land Use Variant would have nearly identical AM peak hour traffic as the RSPU and would only increase PM peak hour traffic by 14 percent, future traffic noise level increases at intersection effected by the project would be very similar to those shown in Table 4.10-11. Thus, the RSPU Land Use Variant would be expected to result a **significant impact**.

### Rail/Light Rail Transport

Noise impacts on future sensitive receptors associated with rail/light rail train pass-by events would be identical to those discussed under the proposed RSPU. Future residential units within Blocks 56 and 69 located along 7$^{th}$ Street would not be expose to rail noise that would exceed the City of Sacramento exterior noise standard of 70 dBA $L_{dn}$. However, just like the RSPU, residential units within blocks 50, 49 and 35 could be located within 190 feet of the centerline of the UPRR tracks. From this distance these residential units could be exposed to rail noise that could exceed the City of Sacramento exterior noise standard of 70 dBA $L_{dn}$. Consequently, the

[28] ESA, 2008. *Fresh & Easy Distribution Truck Noise Study*. November 2008.

noise levels generated by existing train traffic along the UPRR tracks could expose future onsite sensitive receptors to levels at or above the City of Sacramento's compatibility standard of 70 dBA $L_{dn}$ for urban residential infill and mixed-use projects. Therefore, this impact would be considered **significant**.

#### Non-Transportation Noise Sources

Noise impacts associated with stationary sources such as HVAC units and loading docks would be identical to those discussed under the RSPU. Noise sensitive receptors (new residences) within the RSP Area could potentially be located within 123 feet from non-residential buildings where HVAC units would be used. These sensitive land uses could be exposed to HVAC noise levels that would exceed the City's day (55 dBA from 7:00 am to 10:00 pm) and nighttime (50 dBA from 10:00 pm to 7:00 am) Noise Control Ordinance standards. This impact would be **potentially significant**.

### *KP Medical Center*

#### On-Road Transportation

Traffic noise impacts associated with the development of the KP Medical Center were estimated using the FHWA Traffic Noise Model using the same methodology described in the methodology section above. The results of the $L_{dn}$ modeling effort are summarized in **Table 4.10-12** for Baseline Conditions and Baseline plus KP Medical Center. As shown in Table 4.10-12, none of the roadway segment analyzed would result in traffic noise levels that would exceed the normally acceptable $L_{dn}$ threshold for Urban Residential Infill and Mixed-Use Projects of 70 dBA $L_{dn}$.

Although the on-road traffic noise associated with the KP Medical Center would not result in noise levels that would exceed the normally acceptable $L_{dn}$ for Urban Residential Infill and Mixed-Use Projects listed in Table 4.10-12, the KP Medical Center would result in daily $L_{dn}$ noise exposure that would exceed the allowable noise incremental increases detailed in Table 4.10-9 along Richards Boulevard, Bercut Drive, Railyards Boulevard, 7th Street and 5th Street. There are no existing residential uses located adjacent to these roadway segments. This would result in a **less-than-significant impact.**

#### Non-Transportation Noise Sources

##### *Heating, Ventilation, and Air-Conditioning Systems*

The KP Medical Center would include HVAC systems within its hospital and office buildings, which would be consistent with packaged air conditioning systems. Outside of the RSP Area, there are no existing sensitive land uses located within 110 feet of where these HVAC units would be installed; therefore, these nearby residences would not be exposed to noise levels that would exceed the City of Sacramento's nighttime noise standard. However, future sensitive land uses (new residences) constructed within the RSP Area could be placed within 110 feet from the KP Medical Center. These sensitive land uses could be exposed to HVAC noise levels that would exceed the City's day (55 dBA from 7:00 am to 10:00 pm) or nighttime (50 dBA from 10:00 pm to 7:00 am) Noise Control Ordinance and standards. This impact would be **potentially significant**.

**TABLE 4.10-12.**
**BASELINE AND BASELINE PLUS KP MEDICAL CENTER**
**PROJECTED $L_{dn}$ TRAFFIC NOISE LEVELS**

| | Traffic Noise Level, dBA, $L_{dn}$[1] | | | | | |
|---|---|---|---|---|---|---|
| **Roadway Segment** | **Baseline** | **Baseline + KP Medical Center** | **Incremental Increase** | **Incremental Increase Significance Threshold2** | **Significant? (Yes or No)[2]** | **Exceed 70 dBA?** |
| Richards Boulevard | | | | | | |
| between Bercut Drive and N 3rd Street | 66 | 66 | 0 | 1 | No | No |
| between N 3rd Street and Sequoia Pacific Boulevard | 66 | 66 | 0 | 1 | No | No |
| between Sequoia Pacific Boulevard and N 5th Street. | 66 | 66 | 0 | 1 | No | No |
| between N 5th Street and N 7th Street | 66 | 66 | 0 | 1 | No | No |
| between N 7th Street and N 10th Street | 67 | 69 | 2 | 1 | **Yes** | No |
| between N 10th Street and Dos Rios Street | 66 | 67 | 1 | 1 | No | No |
| between Dos Rios Street and N 12th Street | 66 | 67 | 1 | 1 | No | No |
| 12th Street | | | | | | |
| between 16th Street and Sunbeam Avenue | 70 | 70 | 0 | 1 | No | No |
| between Sunbeam Avenue and Dos Rios Street | 67 | 67 | 0 | 1 | No | No |
| between N B Street and E Street | 65 | 65 | 0 | 1 | No | No |
| between E Street and F Street | 65 | 65 | 0 | 1 | No | No |
| Dos Rios Street | | | | | | |
| between Richards Boulevard and N 12th Street | 54 | 54 | 0 | 5 | No | No |
| B Street | | | | | | |
| between Dos Rios Street and 7th Street | 59 | 60 | 1 | 3 | No | No |
| west of 7th Street | 59 | 60 | 1 | 3 | No | No |
| Bannon Street | | | | | | |
| between Sequoia Pacific Boulevard and Bercut Drive | 57 | 57 | 0 | 3 | No | No |
| Sequoia Pacific Boulevard | | | | | | |
| between Richards Boulevard and Bannon Street | 52 | 52 | 0 | 5 | No | No |
| south of Bannon Street | 58 | 58 | 0 | 3 | No | No |
| Bercut Drive | | | | | | |
| between Bannon Street and South Park Street | 46 | 62 | 16 | 8 | **Yes** | No |
| between South Park Street and Railyards Boulevard | NA | 60 | NA | NA | NA | No |
| South Park Street | | | | | | |
| between Bercut Drive and 5th Street | NA | 62 | NA | NA | NA | No |
| Jibboom Street | | | | | | |
| between I-5 and Railyards Boulevard | 63 | 63 | 0 | 2 | No | No |
| between Railyard Boulevard and I Street | 64 | 65 | 1 | 2 | No | No |

**TABLE 4.10-12.**
**BASELINE AND BASELINE PLUS KP MEDICAL CENTER**
**PROJECTED $L_{dn}$ TRAFFIC NOISE LEVELS**

| | Traffic Noise Level, dBA, $L_{dn}$[1] | | | | | |
|---|---|---|---|---|---|---|
| **Roadway Segment** | **Baseline** | **Baseline + KP Medical Center** | **Incremental Increase** | **Incremental Increase Significance Threshold2** | **Significant? (Yes or No)[2]** | **Exceed 70 dBA?** |
| Railyards Boulevard | | | | | No | No |
| between Jibboom Street and Bercut Drive | 62 | 63 | 1 | 2 | No | No |
| between Bercut Drive and KP Medical Center Dropoff | 62 | 63 | 1 | 2 | No | No |
| between KP Medical Center Dropoff and Entry | 62 | 64 | 2 | 2 | No | No |
| between KP Medical Center Entry and 5th Street | 62 | 64 | 2 | 2 | No | No |
| between 5th Street and Judah Street | 63 | 65 | 2 | 2 | No | No |
| between Judah Street and 6th Street | 63 | 65 | 2 | 2 | No | No |
| between 6th Street and 7th Street | 63 | 66 | 3 | 2 | **Yes** | No |
| 10th Street | | | | | | |
| between B Street and Richards Boulevard | 54 | 55 | 1 | 5 | No | No |
| north of Richards Boulevard | 57 | 57 | 0 | 3 | No | No |
| 7th Street | | | | | | |
| north of Richards Boulevard | 56 | 56 | 0 | 3 | No | No |
| between Richards Boulevard and B Street | 61 | 65 | 4 | 2 | **Yes** | No |
| between B Street and South Park Street | 64 | 66 | 2 | 2 | No | No |
| between South Park Street and Railyards Blvd | 64 | 66 | 2 | 2 | No | No |
| between Railyards Blvd and F Street | 61 | 62 | 1 | 2 | No | No |
| between F St and G Street | 61 | 61 | 0 | 2 | No | No |
| between G Street and H Street | 59 | 59 | 0 | 3 | No | No |
| between H Street and I Street | 57 | 57 | 0 | 3 | No | No |
| between I Street and J Street | 57 | 58 | 1 | 3 | No | No |
| 8th Street | | | | | | |
| north of F Street | 55 | 55 | 0 | 3 | No | No |
| between F Street and H Street | 60 | 60 | 0 | 2 | No | No |
| between H Street and I Street | 59 | 59 | 0 | 3 | No | No |
| south of I Street | 60 | 60 | 0 | 2 | No | No |
| 5th Street | | | | | | |
| between South Park Street and Railyards Boulevard | NA | 62 | NA | NA | NA | No |
| between Railyards Boulevard and Camille Lane | 52 | 61 | 9 | 5 | **Yes** | No |
| between Camille Lane and Stevens Street | 52 | 61 | 9 | 5 | **Yes** | No |
| between Stevens Street and H Street | 62 | 65 | 3 | 2 | **Yes** | No |

**TABLE 4.10-12.**
**BASELINE AND BASELINE PLUS KP MEDICAL CENTER**
**PROJECTED $L_{dn}$ TRAFFIC NOISE LEVELS**

| | Traffic Noise Level, dBA, $L_{dn}$[1] | | | | | |
|---|---|---|---|---|---|---|
| **Roadway Segment** | **Baseline** | **Baseline + KP Medical Center** | **Incremental Increase** | **Incremental Increase Significance Threshold2** | **Significant? (Yes or No)[2]** | **Exceed 70 dBA?** |
| between H Street and I Street | 62 | 64 | 2 | 2 | No | No |
| between I Street and J Street | 60 | 62 | 2 | 2 | No | No |
| south of J Street | 59 | 59 | 0 | 3 | No | No |
| 6th Street | | | | | | |
| between Railyards Boulevard and Camille Lane | 57 | 58 | 1 | 3 | No | No |
| between Camille Lane and Stevens Street | 57 | 58 | 1 | 3 | No | No |
| between Stevens Street and H Street | 59 | 58 | -1 | 3 | No | No |
| between H Street and I Street | 58 | 57 | -1 | 3 | No | No |
| south of I Street | 57 | 57 | 0 | 3 | No | No |
| G Street | | | | | | |
| east of 7th Street | 59 | 59 | 0 | 3 | No | No |
| west of 7th Street | 60 | 61 | 1 | 2 | No | No |
| H Street | | | | | | |
| between 5th Street and 6th Street | 58 | 58 | 0 | 3 | No | No |
| between 6th Street and 7th Street | 58 | 58 | 0 | 3 | No | No |
| between 7th Street and 8th Street | 59 | 59 | 0 | 3 | No | No |
| east of 8th Street | 57 | 57 | 0 | 3 | No | No |
| I Street | | | | | | |
| west of 5th Street (Yolo County) | 59 | 59 | 0 | 3 | No | No |
| between 5th Street (Yolo County) and 3rd Street (Yolo County) | 61 | 61 | 0 | 2 | No | No |
| between 3rd Street (Yolo County) and Jibboom Street | 62 | 62 | 0 | 2 | No | No |
| between Jibboom Street and 5th Street | 63 | 64 | 1 | 2 | No | No |
| between 5th Street and 6th Street | 62 | 62 | 0 | 2 | No | No |
| between 6th Street and 7th Street | 62 | 61 | -1 | 2 | No | No |
| between 7th Street and 8th Street | 62 | 61 | -1 | 2 | No | No |
| east of 8th Street | 61 | 61 | 0 | 2 | No | No |
| J Street | | | | | | |
| between 3rd Street and 5th Street | 65 | 66 | 1 | 1 | No | No |
| between 5th Street and 7th Street | 64 | 64 | 0 | 2 | No | No |
| east of 7th Street | 64 | 64 | 0 | 2 | No | No |

**TABLE 4.10-12.**
**BASELINE AND BASELINE PLUS KP MEDICAL CENTER**
**PROJECTED $L_{dn}$ TRAFFIC NOISE LEVELS**

| | Traffic Noise Level, dBA, $L_{dn}$[1] | | | | | |
|---|---|---|---|---|---|---|
| **Roadway Segment** | **Baseline** | **Baseline + KP Medical Center** | **Incremental Increase** | **Incremental Increase Significance Threshold2** | **Significant? (Yes or No)[2]** | **Exceed 70 dBA?** |
| F Street | | | | | | |
| between 7th Street and 8th Street | 58 | 60 | 2 | 3 | No | No |
| between 8th Street and 12th Street | 58 | 60 | 2 | 3 | No | No |
| east of 12th Street | 59 | 60 | 1 | 3 | No | No |
| Tower Bridge Gateway | | | | | | |
| west of 5th Street (Yolo county) | 63 | 63 | 0 | 2 | No | No |
| between 5th Street (Yolo County) and South River Road | 63 | 63 | 0 | 2 | No | No |
| east of S River Road | 64 | 64 | 0 | 2 | No | No |

NOTES:

1. Noise levels were determined using FHWA Traffic Noise Prediction Model (FHWA RD-77-108).
2. Traffic noise increases at an existing sensitive use exceed the allowed incremental noise increase provided in Table 4.10-9 would result in a significant impact.
3. Future residences that are exposed to future traffic noise above the allowed City of Sacramento of 70 dBA Ldn for an infill site would result in a significant impact.

NA = New roadway

Source: ESA, 2016

### *Central Utility Plant*

As discussed under the RSPU above, the proposed KP Medical Center would include a CUP structure that would provide the steam, heating hot water, and chilled water for cooling to all buildings on campus. The primary sources of noise generated within the CUP building would be from the boilers and emergency backup generators. Although the noise generated by the boiler and emergency backup generators could result in a substantial noise from within the CUP building, because these sources would be completely enclosed, the exterior noise levels outside of the CUP build is not expected to result in a substantial noise increase at nearby existing or proposed land uses. Therefore, this impact would result in a **less-than-significant impact**.

### *Loading Docks*

Truck deliveries to the KP Medical Center may be a source of elevated noise levels at sensitive receptors that would be near the truck loading docks. It is anticipated that service and delivery vehicles would access the KP Medical Center from South Park Street, east of the ground level alternative helistop site. Based on conceptual site planning, loading docks could be on the west side of the hospital building. There are no existing sensitive land uses located within 150 feet of

the KP Medical Center site that would be exposed to noise levels that would exceed the City of Sacramento's nighttime noise standard. However, future sensitive land uses (new residences) on blocks within the RSP Area surrounding the KP Medical Center site could be placed within 150 feet from the KP Medical Center buildings where HVAC units would be used. These sensitive land uses could be exposed to HVAC noise levels that would exceed the City's day (55 dBA from 7:00 am to 10:00 pm) or nighttime (50 dBA from 10:00 pm to 7:00 am) Noise Control Ordinance standards. This impact would be **potentially significant**.

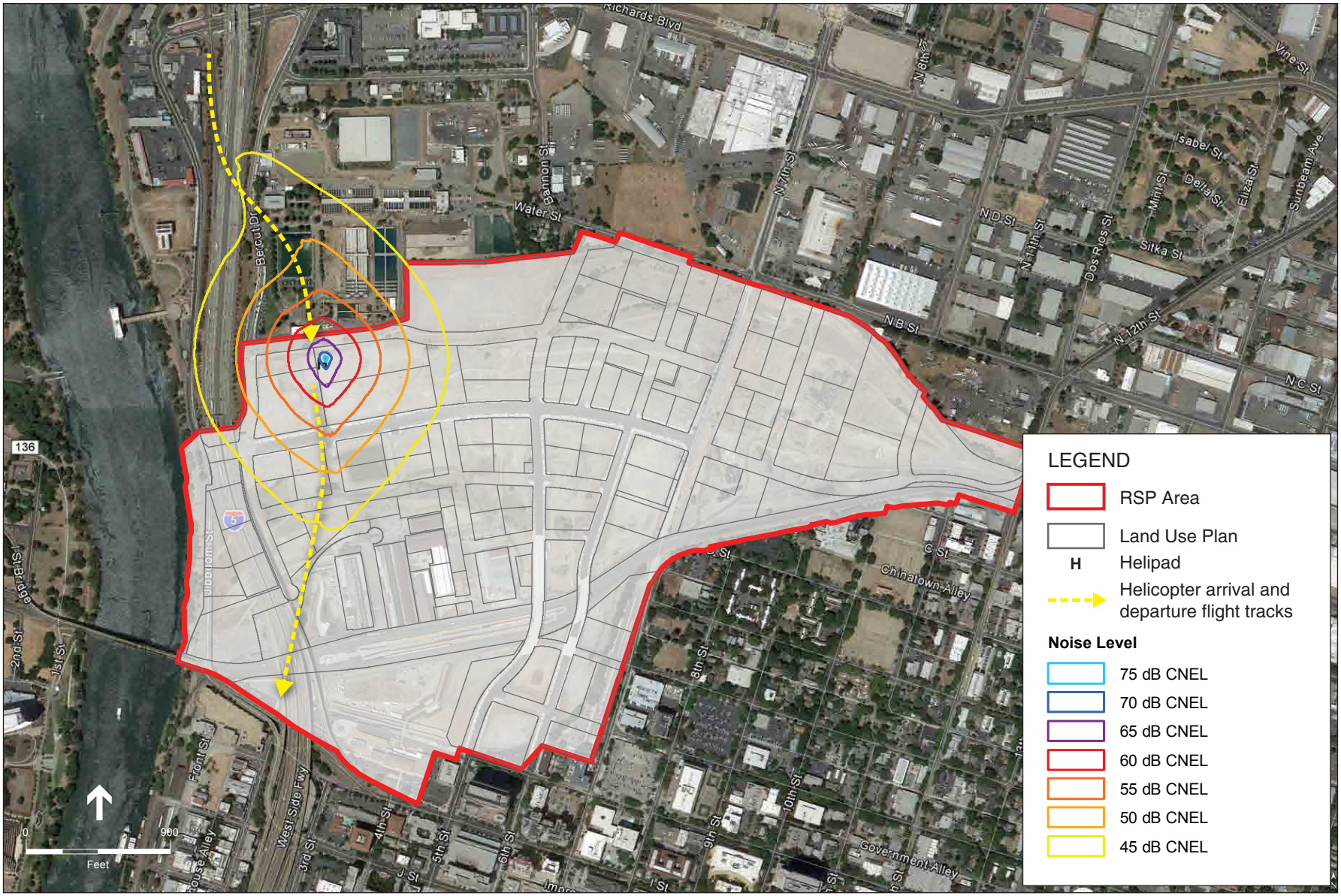
#### *Emergency Vehicle Sirens*

Emergency vehicle sirens are another noise source that would be associated with the hospital activity at the KP Medical Center. Based on the conceptual site plan presented in Chapter 2, Project Description, (see Figures 2-24 and 2-25), the hospital's emergency room and emergency services would be located on the north side of the hospital building facing South Park Street. Emergency vehicle ingress and egress would be located on South Park Street. Ambulance sirens can generate noise levels at about 90 dBA from curb of roadway. However, it is operational practice that sirens are not used as the ambulance approaches the hospital as critical cases are typically stabilized by that time. Further, noise generated by emergency vehicles is not subject to the local noise standards considering the urgent and imperative nature of the operations. The use of ambulance sirens (and lights) for emergency cases is guided by the State Highway Patrol and Department of Motor Vehicles and is a necessary "request" for the right-of-way from other drivers. Although emergency vehicle access routes within the proposed project sites would likely be adjacent to existing or future onsite residential receptors, the noise generated by the emergency vehicles sirens would be exempt from the City of Sacramento noise ordinance. This impact would be **less-than-significant**.

#### *Helistop Noise*

The proposed KP Medical Center would not be a Level 1 Trauma Center; rather, helicopter use of the helistop would be for non-emergency transfer of patients who, for medical reasons, are most appropriately moved to or from the proposed KP Medical Center to another acute care facility through the air rather than via traditional vehicular ambulances. This can typically reduce materially the amount of time in transport which can be advantageous for certain patients. The project applicant has indicated that during final design a decision would be made to locate the helistop either at ground level on the west side of the KP Medical Center project site or on the top of the hospital building. In order to account for either eventuality, the noise effects of both scenarios have been evaluated.

Using the FAA's Aviation Environmental Design Tool (AEDT), Version 2B, the 65 dBA CNEL contour has been prepared for the proposed helistop at ground level and on top of the hospital building, which are illustrated in **Figures 4.10-2** and **4.10-3**, respectively. In both cases, the helistop's future 65 dBA $L_{dn}$ contour would be entirely on the KP Medical Center site. As shown in Table 4.10-6, the ambient noise (day-night average noise) levels measured at the KP Medical Center site (represented by measurements at LT-1) were found to range between 68 dBA and




SOURCE: Google, 2015; Kimley Horn, 2015; Lionakis, 2016; ESA, 2016

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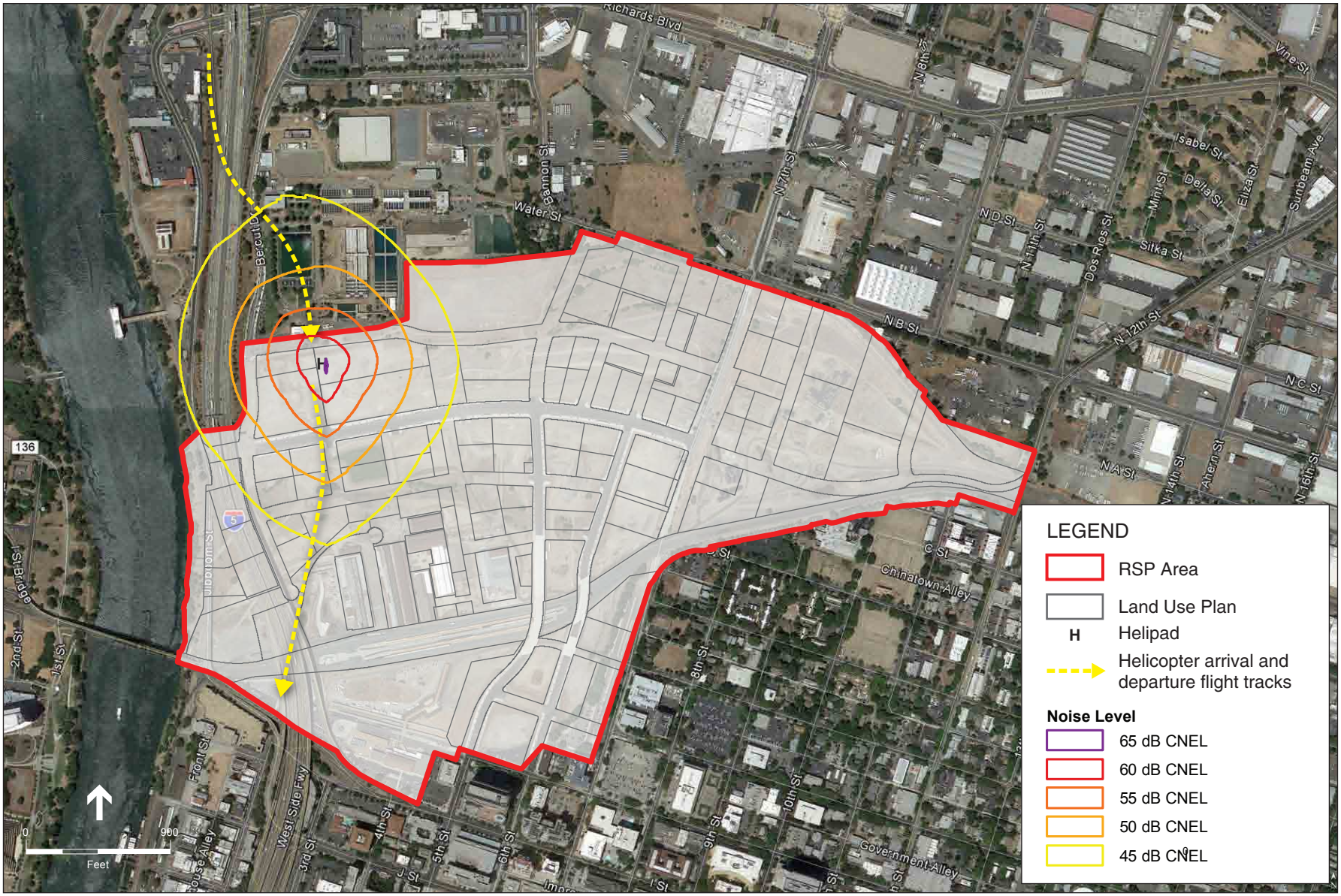
**Figure 4.10-2**
KP Medical Center
Helistop 65 dB CNEL Contour At Ground Level




SOURCE: Google, 2015; Kimley Horn, 2015; Lionakis, 2016; ESA, 2016

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**Figure 4.10-3**
KP Medical Center
Helistop 65 dB CNEL Contour Elevated

70 dBA $L_{dn}$, which was highly dependent on vehicular traffic along the I-5 viaduct immediately west of the KP Medical Center site. The ambient noise levels in the vicinity of the KP Medical Center site are much higher than those that would be generated by the proposed helistop by approximately 3 to 5 dB near the helistop. Although the noise generated by a helicopter arrival and departure is high, its relative infrequency (one to three times per week) means that it has little effect on the average ambient noise level.

The duration of the maximum single-event noise at the proposed helistop would be very limited with approximately two to six total operations (departures and arrival flights) per week. Although not prohibited, because the helistop would not be used for emergency transport, it is expected that the vast majority of helistop operations would take place during the day and that nighttime operations would be infrequent. The noise generated by helicopter flights to and from the proposed helistop would result in a maximum noise exposure at the nearest onsite residences to the helistop, located on Block 4 across Railyards Boulevard, of up to 88 $L_{max}$, dBA at ground level and 82 dBA $L_{max}$ elevated. The maximum noise level from the helistop at ground level does not account for attenuation from onsite buildings such as the hospital and office buildings, which could attenuate helicopter noise as much as 5 dB. Since sensitive receptors near the KP Medical Center would have direct line-of-sight of the elevated helipad, there would be no noise attenuation from intervening buildings between the proposed elevated helistop and nearby sensitive receptors. Because helicopter activities at the helistop would only occur during the daytime hours when the future ambient is at its highest (e.g., vehicular, train and aircraft noise sources), it is unlikely that the maximum noise levels generated at the helistop would be high enough to disrupted residences located in Block 4. In addition, since helicopter operations at the helistop would mainly occur during the daytime hours and nighttime operations would be infrequent, there would be no impacts related to sleep disturbance.

The City of Sacramento Noise Ordinance states that noise cannot be generated that would result in the exterior sound level on sensitive land uses to exceed 75 dBA $L_{max}$. However, according to the City's Noise Control Ordinance standards (per Code Section 8.68.080), aircraft noise is preempted by state or federal law or regulation, thus, helicopter operations would not violate the City's standards.

Helicopters are considered transportation sources for which applicable noise regulations are promulgated and enforced by the FAA and not by local ordinance. FAA noise standards for aircraft are established in terms of long-term noise descriptors (community noise exposure level) which account for aircraft operations throughout the day and night and were developed to address aircraft noise impacts on receptors near airports. According to the FAA published guidelines for land use compatibility in 14 Code of Federal Regulations (CFR) Part 150, a significant noise impact would occur if noise sensitive land uses would be exposed to levels of 65 dBA CNEL or higher as a result of the project. Ambient noise levels would be temporarily exceeded when helicopters use the helistop. However, given the brief time during the one or two days per week on which helicopter operations would occur, the associated $L_{dn}$ noise metric would not exceed the

FAA noise restrictions. Thus, helicopter activity at the proposed KP Medical Center helistop would not be considered to result in a substantial noise increase within the project area. The impact would be **less than significant**.

### *MLS Stadium*

#### On-Road Transportation

Vehicles traveling to and from the proposed MLS Stadium would create traffic-generated noise. These additional vehicle trips would result in higher noise levels along the downtown street network. Noise level projections were made using the FHWA Noise Prediction Model for those road segments that would experience the greatest increase in traffic volume and that are in proximity to sensitive receptors. The model is based on the Calveno reference noise factors for automobiles, medium trucks and heavy trucks, with consideration given to vehicle volume and speed. The segments analyzed and results of the modeling are shown in **Table 4.10-13** (pre-event peak hour $L_{eq}$).

**TABLE 4.10-13.**
**BASELINE AND BASELINE PLUS MLS STADIUM**
**PROJECTED PRE-EVENT PEAK-HOUR TRAFFIC NOISE LEVELS**

| | Traffic Noise Level, dBA, Leq[1] | | | | |
|---|---|---|---|---|---|
| **Roadway Segment** | **Baseline** | **Baseline + MLS Stadium** | **Incremental Increase** | **Incremental Increase Significance Threshold[2]** | **Significant? (Yes or No)[2]** |
| Richards Boulevard | | | | | |
| between Bercut Drive and N 3rd Street | 61 | 64 | 3 | 5 | No |
| between N 3rd Street and Sequoia Pacific Boulevard | 61 | 64 | 3 | 5 | No |
| between Sequoia Pacific Boulevard and N 5th Street. | 61 | 64 | 3 | 5 | No |
| between north 5th Street and N 7th Street | 61 | 64 | 3 | 5 | No |
| between N 7th Street and N 10th Street | 61 | 64 | 3 | 5 | No |
| between N 10th Street and Dos Rios Street | 60 | 64 | 4 | 5 | No |
| between Dos Rios Street and N 12th Street | 60 | 64 | 4 | 5 | No |
| 12th Street | | | | | |
| between 16th Street and Sunbeam Avenue | 63 | 65 | 2 | 5 | No |
| between Sunbeam Avenue and Dos Rios Street | 59 | 62 | 3 | 6 | No |
| between N B Street and E Street | 59 | 59 | 0 | 6 | No |
| between E Street and F Street | 58 | 58 | 0 | 6 | No |
| Dos Rios Street | | | | | |
| between Richards Boulevard and N 12th Street | 52 | 51 | -1 | 9 | No |

**TABLE 4.10-13.**
**BASELINE AND BASELINE PLUS MLS STADIUM**
**PROJECTED PRE-EVENT PEAK-HOUR TRAFFIC NOISE LEVELS**

| | Traffic Noise Level, dBA, Leq[1] | | | | |
|---|---|---|---|---|---|
| **Roadway Segment** | **Baseline** | **Baseline + MLS Stadium** | **Incremental Increase** | **Incremental Increase Significance Threshold[2]** | **Significant? (Yes or No)[2]** |
| B Street | | | | | |
| between Dos Rios Street and 7th Street | 53 | 59 | 6 | 9 | No |
| west of 7th Street | 53 | 57 | 4 | 9 | No |
| Bannon Street | | | | | |
| between Sequoia Pacific Boulevard and Bercut Drive | 51 | 53 | 2 | 9 | No |
| Sequoia Pacific Boulevard | | | | | |
| between Richards Boulevard and Bannon Street | 50 | 51 | 1 | 9 | No |
| south of Bannon Street | 52 | 54 | 2 | 9 | No |
| Bercut Drive | | | | | |
| South of Bannon Street | 47 | 47 | 0 | 12 | No |
| Jibboom Street | | | | | |
| between I-5 and Railyards Boulevard | 58 | 59 | 1 | 6 | No |
| between Railyard Boulevard and I Street | 59 | 61 | 2 | 6 | No |
| Railyards Boulevard | | | | | |
| between Jibboom Street and Bercut Drive | 56 | 60 | 4 | 6 | No |
| between Bercut Drive and KP Medical Center Drop-off | 56 | 60 | 4 | 6 | No |
| between KP Medical Center Drop-off and Entry | 56 | 60 | 4 | 6 | No |
| between KP Medical Center Entry and 5th Street | 56 | 60 | 4 | 6 | No |
| between 5th Street and Judah Street | 57 | 60 | 3 | 6 | No |
| between Judah Street and 6th Street | 57 | 60 | 3 | 6 | No |
| between 6th Street and 7th Street | 57 | 60 | 3 | 6 | No |
| between 7th Street and 8th Street | NA | 59 | NA | NA | NA |
| between 8th street and 10th Street | NA | 56 | NA | NA | NA |
| 10th Street | | | | | |
| between Railyards Boulevard and B Street | NA | 54 | NA | NA | NA |
| between B Street and Richards Boulevard | 49 | 55 | 6 | 12 | No |
| north of Richards Boulevard | 49 | 50 | 1 | 12 | No |
| 7th Street | | | | | |
| north of Richards Boulevard | 51 | 59 | 8 | 9 | No |

**TABLE 4.10-13.**
**BASELINE AND BASELINE PLUS MLS STADIUM**
**PROJECTED PRE-EVENT PEAK-HOUR TRAFFIC NOISE LEVELS**

| | Traffic Noise Level, dBA, Leq[1] | | | | |
|---|---|---|---|---|---|
| **Roadway Segment** | **Baseline** | **Baseline + MLS Stadium** | **Incremental Increase** | **Incremental Increase Significance Threshold[2]** | **Significant? (Yes or No)[2]** |
| between Richards Boulevard and B Street | 54 | 59 | 5 | 9 | No |
| between B Street and South Park Street | 57 | 60 | 3 | 6 | No |
| between South Park Street and Railyards Blvd | 57 | 60 | 3 | 6 | No |
| between Railyards Blvd and F Street | 53 | 59 | 6 | 9 | No |
| between F St and G Street | 54 | 57 | 3 | 9 | No |
| between G Street and H Street | 51 | 55 | 4 | 9 | No |
| between H Street and I Street | 51 | 51 | 0 | 9 | No |
| between I Street and J Street | 52 | 52 | 0 | 9 | No |
| 8th Street | | | | | |
| between B Street and Railyards Boulevard | NA | 57 | NA | NA | NA |
| north of F Street | 50 | 50 | 0 | 9 | No |
| between F Street and H Street | 51 | 57 | 6 | 9 | No |
| between H Street and I Street | 52 | 57 | 5 | 9 | No |
| south of I Street | 54 | 58 | 4 | 9 | No |
| 5th Street | | | | | |
| between Railyards Boulevard and Camille Lane | 50 | 61 | 11 | 9 | **Yes** |
| between Camille Lane and Stevens Street | 50 | 61 | 11 | 9 | **Yes** |
| between Stevens Street and H Street | 56 | 60 | 4 | 6 | No |
| between H Street and I Street | 57 | 61 | 4 | 6 | No |
| between I Street and J Street | 55 | 60 | 5 | 6 | No |
| south of J Street | 54 | 57 | 3 | 9 | No |
| 6th Street | | | | | |
| between Railyards Boulevard and Camille Lane | 52 | 57 | 5 | 9 | No |
| between Camille Lane and Stevens Street | 52 | 58 | 6 | 9 | No |
| between Stevens Street and H Street | 52 | 58 | 6 | 9 | No |
| between H Street and I Street | 52 | 57 | 5 | 9 | No |
| south of I Street | 50 | 57 | 7 | 9 | No |
| G Street | | | | | |
| east of 7th Street | 56 | 59 | 3 | 6 | No |
| west of 7th Street | 55 | 58 | 3 | 6 | No |

**TABLE 4.10-13.**
**BASELINE AND BASELINE PLUS MLS STADIUM**
**PROJECTED PRE-EVENT PEAK-HOUR TRAFFIC NOISE LEVELS**

| | Traffic Noise Level, dBA, Leq[1] | | | | |
|---|---|---|---|---|---|
| **Roadway Segment** | **Baseline** | **Baseline + MLS Stadium** | **Incremental Increase** | **Incremental Increase Significance Threshold[2]** | **Significant? (Yes or No)[2]** |
| H Street | | | | | |
| between 5th Street and 6th Street | 52 | 55 | 3 | 9 | No |
| between 6th Street and 7th Street | 52 | 56 | 4 | 9 | No |
| between 7th Street and 8th Street | 52 | 55 | 3 | 9 | No |
| east of 8th Street | 53 | 53 | 0 | 9 | No |
| I Street | | | | | |
| west of 5th Street (Yolo County) | 56 | 56 | 0 | 6 | No |
| between 5th Street (Yolo County) and 3rd Street (Yolo County) | 58 | 59 | 1 | 6 | No |
| between 3rd Street (Yolo County) and Jibboom Street | 58 | 59 | 1 | 6 | No |
| between Jibboom Street and 5th Street | 61 | 61 | 0 | 5 | No |
| between 5th Street and 6th Street | 59 | 59 | 0 | 6 | No |
| between 6th Street and 7th Street | 58 | 59 | 1 | 6 | No |
| between 7th Street and 8th Street | 59 | 59 | 0 | 6 | No |
| east of 8th Street | 58 | 59 | 1 | 6 | No |
| J Street | | | | | |
| between 3rd Street and 5th Street | 59 | 62 | 3 | 6 | No |
| between 5th Street and 7th Street | 58 | 60 | 2 | 6 | No |
| east of 7th Street | 58 | 58 | 0 | 6 | No |
| F Street | | | | | |
| between 7th Street and 8th Street | 51 | 57 | 6 | 9 | No |
| between 8th Street and 12th Street | 51 | 57 | 6 | 9 | No |
| east of 12th Street | 53 | 57 | 4 | 9 | No |
| Tower Bridge Gateway | | | | | |
| west of 5th Street (Yolo county) | 56 | 57 | 1 | 6 | No |
| between 5th Street (Yolo County) and South River Road | 57 | 57 | 0 | 6 | No |
| east of S River Road | 57 | 58 | 1 | 6 | No |

NOTES:

1. Noise levels were determined using FHWA Traffic Noise Prediction Model (FHWA RD-77-108).
2. Traffic noise increases at an existing sensitive use exceed the allowed incremental noise increase provided in Table 4.10-9 would result in a significant impact.

NA = New roadway

Source: ESA, 2016

The results of the pre-event peak hour $L_{eq}$ modeling are summarized in Table 4.10-13 for Baseline Conditions and Baseline plus Project. Traffic associated with events at the MLS Stadium would result in peak hour noise exposure that would exceed the allowable noise increases detailed in Table 4.10-9 at residential uses along 5th Street, between Railyards Boulevard and Stevens Street. However, there are no existing residential units located along this segment of roadway. This would result in **a less than significant impact**.

### Non-Transportation Noise Sources

#### *Heating, Ventilation, and Air-Conditioning Systems*

The proposed MLS Stadium would include HVAC systems within its locker rooms, lounges, kitchens, medical and press facilities, security command center and related facilities, which would be consistent with packaged air conditioning systems. There are no existing sensitive land uses located within 110 feet of where these HVAC units would be installed. Therefore, existing residences would not be exposed to noise levels that would exceed the City of Sacramento nighttime noise standard. However, the proposed RSPU provides for the development of housing on Blocks 56 and 69 (across 8th Street to the west) that could be located within 110 feet of the proposed Stadium. Therefore, future sensitive land uses could be exposed to HVAC noise levels that would exceed the City's day (55 dBA from 7:00 am to 10:00 pm) or nighttime (50 dBA from 10:00 pm to 7:00 am) Noise Control Ordinance standards. This impact would be **potentially significant**.

#### *Loading Docks*

Truck deliveries at the proposed MLS Stadium may be a source of elevated noise levels at sensitive receptors that would be near the truck loading docks, which are proposed to be located at the field level on the south side of the Stadium structure, accessed from Railyards Boulevard. There are no existing offsite sensitive land uses located within 150 feet of the Stadium loading docks that would be exposed to noise levels that would exceed the City of Sacramento's nighttime noise standard. However, there may be residential units developed in the future on Blocks 56 and 69 that could be located within 150 feet of the Stadium. Therefore, future onsite sensitive land uses could be exposed to loading dock noise levels that would exceed the City's daytime (55 dBA from 7:00 am to 10:00 pm) or nighttime (50 dBA from 10:00 pm to 7:00 am) Noise Control Ordinance standards. This impact would be **potentially significant**.

#### *Amplified Sound*

The proposed MLS Stadium would be located on an approximately 14-acre parcel (proposed Lot 52) near the eastern end of the RSP Area, north of Railyards Boulevard, between 8th Street and 10th Street, and south of the embankment that forms the northern boundary of the project site (see Figure 2-28 MLS Stadium Conceptual Site Plan). The proposed Stadium would be enclosed (with the exception of vomitories) but not covered. In addition, there could be stages placed in the plazas west and north of the Stadium. Several times per year (up to 7 concerts based on Chapter 2, Table 2-10) there would be concerts or cultural events that would use amplified sound. These events are expected to occur periodically through the spring, summer, and/or fall months when weather allows.

The primary sources of amplified sound during either a soccer match, concert or music festival at the proposed MLS Stadium would be from the speakers at the temporary outdoor event stages (proposed to be located on the west and north sides of the Stadium), concert event stage (proposed to be located on the southernmost end of the soccer pitch), and public address systems at the primary Stadium entrances. Since the design of the sound system at the proposed MLS Stadium has not yet been finalized, the sound parameters of the speakers that could be used at the MLS Stadium are unknown at this time. Although the Stadium seating bowl would be largely concrete with openings (vomitories) to accommodate attendee ingress/egress and would be partially covered with a roof structure over much of the seating area, in order to provide a conservative analysis, no noise attenuation was attributed to the Stadium structure. In addition, as discussed in greater detail below, this SEIR assumes that sound amplification would be at levels that represent the maximum allowable under the City's Noise Control Ordinance.

Different types of events typically are presented on different days and at different times. Events at the Stadium would occur primarily during weekends and on weekday evenings. For purposes of a conservative analysis, it has been assumed that MLS soccer matches would be attended by full-capacity crowds with up to 25,000 ticketed attendees.

Noise measurements conducted in the proximity of the MLS Stadium (Table 4.10-5) indicate that existing ambient noise levels in the vicinity of the Stadium at ST-2, 3, and 10 were 60, 56, and 55 dBA $L_{eq}$, respectively. According the City of Sacramento Municipal Code (8.68.060 Exterior Noise Standards), the daytime and nighttime exterior noise standards at nearby sensitive land uses would be 60 dBA (from 7:00 am to 10:00 pm) and 55 dBA (from 10:00 pm to 7:00 am) for noise consisting of speech or music.

The City of Sacramento Municipal Code does not allow amplified sound to exceed 98 dBA $L_{eq}$ from a distance of 150 feet. For this analysis, it is conservatively assumed that the speakers at the proposed outside temporary event stages, concert event stage, and public address systems would generate noise levels greater than what is allowed on the City of Sacramento Municipal Code. Assuming an attenuation rate of 7.5 dBA per doubling of distance from the MLS Stadium and attenuation of 10 dB from intervening structures, sensitive land uses would be exposed to amplified sound from concerts that would exceed the City of Sacramento's daytime and nighttime noise standards for amplified sound if they were located within approximately 2,000 feet (daytime standard) and within approximately 3,000 feet (nighttime standard).

Geographically, nighttime noise impacts extending up to approximately 3,000 feet could potentially affect an area that extends to H Street on the south, 15$^{th}$ Street on the southeast, 16$^{th}$ Street on the east, the intersection of Richards Boulevard and Dos Rios Street on the northeast, just north of the intersection of Cannery Avenue and North 7$^{th}$ Street to the north, the intersection of Richards Boulevard and Sequoia Pacific Boulevard on the northwest, the intersection of the future intersection of Railyards Boulevard and Huntington Street on the west, and the intersection of I Street and 6$^{th}$ Street on the southwest. There are a number of single- and

multi-family residences located within these distances around the proposed MLS Stadium, including in the Alkali Flat and Mansion Flats neighborhoods, the Cannery Place Apartments in the Township 9 development, Dos Rios public housing project, Quinn Cottages, and several social service shelters in the River District. During major noise producing events at the MLS Stadium, these residential land uses would be exposed to amplified sound levels that would exceed the City of Sacramento's exterior night noise standard for amplified sound.

Daytime noise impacts generally are considered less significant than nighttime noise. Daytime noise impacts would extend up to approximately 2,000 feet, potentially affecting an area that extends to Fat Alley on the south, intersection of E and 12th Street on the southeast, North 14th Street on the east, the intersection of Dos Rios and North D Street on the northeast, Richards Boulevard to the north, Water and Bannon Street on the northwest, the intersection of Railyards Boulevard and Standard Street on the west, and the intersection of North 7th Street and F Street on the southwest. Daytime noise levels would exceed the City of Sacramento's exterior night noise standard for amplified sound at single- and multi-family homes located in the northern part of the Alkali Flat neighborhood and the northwest portion of Mansion Flats neighborhood. The potential sensitive receptors most exposed to amplified sound generated during major events at the MLS Stadium include the KCRA building (approximately 500 feet south of the MLS Stadium), residences along D Street (approximately 1,000 feet north-west from the MLS Stadium), Globe Mills (approximately 720 feet south-east from the MLS Stadium), Quinn Cottages (approximately 1,000 feet east from the MLS Stadium), Dos Rios Housing Project (approximately 2,300 feet north-east from the MLS Stadium), residences on Water Street (approximately 2,100 feet north-west from the MLS Stadium) and future residences across 8th Street (approximately 300 feet west of the MLS Stadium). The estimated exterior noise levels at these sensitive receptors from amplified sound from the MLS Stadium during a major event are provided in **Table 4.10-14**. As shown in Table 4.10-14, amplified sound at all sensitive receptors near the proposed MLS Stadium could exceed the City's daytime and nighttime noise standards.

**TABLE 4.10-14.**
**ESTIMATED EXTERIOR NOISE LEVELS AT THE NEAREST SENSITIVE RECEPTORS TO THE MLS STADIUM DURING A MAJOR EVENT**

| Sensitive Receptor | Distance from MLS Stadium (feet) | Exterior Noise Level (dBA $L_{eq}$)[1] |
|---|---|---|
| Future residences in Block 56 | 300 | 90 |
| KCRA Studios/Creamery at Alkali Flat | 500 | 85 |
| Lofts at Globe Mills | 720 | 81 |
| Residences along D Street | 1,000 | 77 |
| Quinn Cottages | 1,000 | 77 |
| Residences on Water Street | 2,100 | 69 |
| Dos Rios Housing Project | 2,300 | 68 |

NOTE:

1. Exterior noise levels from the amplified sound system at the MLS Stadium at the nearest sensitive receptor were calculated assuming a soft groundcover and using a reference noise level of 98 dBA $L_{eq}$ from a distance of 150 feet.

Source: ESA, 2016

Because major noise producing events at the proposed MLS Stadium would expose sensitive receptors to noise levels that would exceed the City's exterior day and night noise standards, this impact is considered **significant**.

### *Game Noise*

During an soccer match, game noise, including cheering, singing, public address announcements, and the like, would be one of the main sources of noise in the vicinity of the proposed MLS Stadium. On February 13, 2015, ESA staff conducted a noise measurement survey at Bonney Field in Sacramento, California during a matchup between the Sacramento Republic Football Club (FC) and Colorado Rapids. Bonney Field capacity is approximately 11,500 attendees. During the noise measurement survey, approximately 80% of the seats were filled. A Larson Davis 831 noise meter was used to monitor the game noise during the soccer match up from a distance of 272 feet from the center of the soccer field. The noise levels during the event were found to be 72.3 dBA $L_{eq}$. Although there was some amplified sound to signal the start and end of soccer matches, the dominant noise source during the game was generated by crowd noise (i.e., fans beating drums, cheering, and stomping their feet).

For this analysis it is assumed that the game noise (including use of public address systems) generated within and outside of the proposed MLS Stadium during a major league soccer match would be the same as those measured at Bonney Field. Bonney Field is constructed of temporary bleacher systems that are open metal construction, compared to the concrete seating bowl with partial roof structures in the proposed MLS Stadium. Thus, this assumption is conservative in light of the different construction of Bonney Field from the proposed MLS Stadium Assuming a 7.5 dBA drop-off rate per doubling of distance and a reference noise level of 72.3 dBA $L_{eq}$ from a distance of 272 feet, existing sensitive land uses located approximately 800 feet from the MLS Stadium would be exposed to game noise that would exceed the City of Sacramento's daytime noise standard of 55 dBA $L_{eq}$. Sensitive land uses located within this distance include existing residences in the Alkali Flat neighborhood along 10$^{th}$ Street north of Chinatown Alley (including the Lofts at Globe Mills and the Creamery at Alkali Flat), and existing residences located near the intersection of 8$^{th}$ Street and D Street (including potentially the City Square Apartments and the Washington Square Apartments). These sensitive land uses would be exposed to game noise that would be less than existing noise levels generated by passing trains on the UPRR tracks, but would exceed the City of Sacramento day and night time noise standard for noise sources consisting of speech or music. This impact is considered **significant**. Other sensitive land uses in the vicinity would be located farther away and would have extensive intervening structures between the Stadium and the other residences that would shield noise levels to some extent.

The nearest non-residential sensitive receptor to the MLS Stadium is the KCRA building located approximately 500 feet south of the MLS Stadium, across the UPRR rail tracks. Assuming a 7.5 dBA drop-off rate per doubling of distance and a reference noise level of 72.3 dBA $L_{eq}$ from a distance of 272 feet, the KCRA building would be exposed to crowed noise from the MLS Stadium during a major soccer event of 66 dBA $L_{eq}$. This noise level is below the City's Exterior

Noise Compatibility Standard of 70dBA $L_{dn}$ for business, commercial and professional uses. As previously discussed, the KCRA building is located approximately 80 feet from the centerline of the UPRR rail line and is already exposed to frequent passenger and freight train pass-bys that generate noise levels substantially higher than the game noise levels that would be generated at the proposed MLS Stadium. Thus, this impact would be considered **less than significant**.

## *Stormwater Outfall*

### Non-Transportation Noise Sources

#### *Pump Noise*

The proposed Stormwater Outfall would include a pump station structure would be 135 feet long and 40 feet wide, most of which would be located underground in a site located under the elevated structure of I-5. The pump station would be able to pump a minimum of 400 cubic feet per second. Up to five vertical turbine pumps would move water into seven discharge force mains and ultimately into the Sacramento River. Since the nearest existing and future sensitive receptors to the Stormwater Outfall would be located over 1,000 feet away and in close proximity to I-5, noise generated by the underground pumps and generators would likely not be audible at the nearest sensitive receptor locations due to existing elevated traffic noise levels. This impact would be **less than significant**.

## *Summary*

Future traffic increases associated with the development of the proposed RSPU, RSPU Land Use Variant, and KP Medical Center would result in noise increases along roadway segments in the vicinity of these proposed projects that would expose nearby sensitive receptors to substantial noise increases over baseline conditions. Future development of both the RSPU and RSPU Land Use Variant would place residential units within 190 feet of the UPRR rail line. From this distance, these residential units could be expose exterior noise levels that would exceed the City of Sacramento exterior noise standard. The positions of HVAC units and loading docks with the proposed projects, with the exception of the proposed Stormwater Outfall, would expose future residences to mechanical and truck idling noise levels that would exceed the City of Sacramento stationary noise standards. Lastly, the amplified sound and game noise generated at the proposed MLS Stadium during major events could expose existing and future sensitive receptors in the vicinity of the Stadium to noise levels that would exceed the City of Sacramento day and nighttime exterior noise standard for speech and music. This would result in a **significant impact**.

Mitigation Measure

Mitigation Measure 4.10-2(a) described below is similar to those discussed in Mitigation Measure 6.8-3 on page 6.8-22 of the 2007 RSP EIR. Mitigation Measure 4.10-2(b) is a new mitigation measure specific to event noise from the proposed MLS Stadium. The mitigation measures listed below add specific requirements related to the loading docks at onsite commercial uses and amplified sound and game noise that would be associated with the proposed MLS Stadium.

**Mitigation Measure 4.10-2(a) (RSPU, KPMC, MLS)**

*The project sponsor shall ensure that the following measures are implemented for all development under the proposed Specific Plan:*

*i. Prior to the issuance of building permits, the applicant shall submit engineering and acoustical specification for project mechanical HVAC equipment and the proposed locations of onsite loading docks to the Planning Director demonstrating that the HVAC equipment and loading dock design (types, location, enclosure, specification) will control noise from the equipment to at least 10 dBA below existing ambient levels at nearby residential and other noise-sensitive land uses.*

*ii. Noise-generating stationary equipment associated with proposed commercial and/or office uses, including portable generators, compressors, and compactors shall be enclosed or acoustically shielded to reduce noise-related impacts to noise-sensitive residential uses.*

*iii. In order to avoid the exposure of rail noise to onsite future sensitive receptors that would exceed the City of Sacramento exterior noise standards, residential units within Blocks 35, 49 and 50 shall not be placed closer than 190 feet from the centerline of the UPRR rail line.*

**Mitigation Measure 4.10-2(b) (MLS)**

*i. The project applicant shall retain a qualified acoustical consultant to verify that the MLS Stadium architectural and outdoor amplified sound system designs incorporate all feasible acoustical features in order to comply with the City of Sacramento Noise Control Ordinance.*

*ii. The project applicant shall be required to limit speakers at temporary plaza stages outside the stadium to be no louder than 100 dBA measured five (5) feet from the source.*

**Impact Significance After Mitigation:** No feasible mitigation strategies have been identified to reduce the on-road transportation noise impacts to less than significant. Alternative modes of transportation (i.e., walking, biking, and transit) are already accounted for in the above traffic noise estimates. The reduction in vehicular use needed to mitigate these roadway noise impacts is not feasible for the proposed projects. In addition, typical measures to reduce roadway noise impacts, such as noise walls, setbacks, and rubberized asphalt, are not considered feasible mitigation for development in the urban core of the City. This impact would be considered **significant and unavoidable**.

Impacts of non-transportation noise sources (i.e., HVAC units, amplified sound and loading docks), with implementation of **Mitigation Measure 4.10-2(a)**, would be reduced to less-than-

significant levels. While it is likely that through the implementation of **Mitigation Measure 4.10-2(b)** the outdoor amplified sound system at the proposed MLS Stadium could be designed to minimize noise exposure at off-site residences through such measures as speaker height, orientation and volume control, outdoor speaker operations during concerts would be expected to exceed the exterior daytime and nighttime noise standards of the Noise Control Ordinance at the existing and future sensitive receptors. As a result, impacts of amplified exterior sound systems and game noise would be considered **significant and unavoidable**.

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**Impact 4.10-3: The proposed projects could result in residential interior noise levels of 45 dBA $L_{dn}$ or greater caused by noise level increases due to project operation.**

The 2007 RSP EIR discussed interior noise impacts under Impact 6.8-2 on pages 6.8-18 through 6.8-20, and concluded that there would be no interior noise impact since residential units would be required to meet Title 24 standards for interior noise levels and found them to be less than significant.

### *Railyards Specific Plan Update*

Table 4.10-11 shows the future traffic noise levels along roadways segments in the vicinity of the RSPU. An exterior noise exposure of 70 dBA or greater would result in potentially incompatible interior noise for new urban infill sensitive receptors. The multi-family residences to be developed as part of the RSPU would be subject to Title 24 of the California Code of Regulations, which requires an interior noise standard of 45 dBA $L_{dn}$ in any habitable room and requires an acoustical analysis demonstrating how dwelling units have been designed to meet this interior standard. To allow the project to meet the City and State interior noise requirement of 45 dBA $L_{dn}$, in habitable rooms of residential dwellings, the exterior facades of RSP Area residential buildings would need to be designed to reduce sound transmission (i.e., exterior-to-interior noise).

Project operations would also result in noise exposure of residential receptors in the project vicinity, as described above in Impact 4.10-2. For on-road transportation sources, the total roadway noise from Baseline and RSPU-related traffic would not exceed the 70 dBA $L_{dn}$ standard at exiting or proposed residential use. Since none of the roadways segments analyzed would exceed the City of Sacramento exterior noise standards, it is unlikely that interior noise levels at existing residential uses adjacent to these roadway segments would increase above 45 dBA $L_{dn}$. However, game noise, loud voices and noise generated by departing patrons, and/or outdoor amplified sound systems in the plaza associated with certain events at the MLS Stadium could result in substantial noise during the evening and nighttime hours (depending on the event timing). Exterior speaker systems are anticipated to be the loudest noise generator outside the MLS Stadium, and could result in **potentially significant** interior noise at existing and future residences.

#### Railyards Specific Plan Update Land Use Variant

As discussed in Impact 4.10-2, the RSPU Land Use Variant would result in similar traffic impacts as those found under the RSPU. This is because the RSPU Land Use Variant would generate an equivalent amount of AM peak hour traffic, but 14 percent more PM peak hour traffic when compared to the RSPU. In addition, the RSPU Land Use Variant would not include the MLS Stadium, which would result in no pre-event peak hour traffic. Since the RSPU Land Use Variant would have nearly identical AM peak hour traffic as the RSPU and would only increase PM peak hour traffic by 14 percent, future traffic noise level increases at intersection effected by the project would be very similar to those discussed above under the RSPU. Thus, the RSPU Land Use Variant would be expected to result a **less-than-significant impact**.

### *KP Medical Center*

As discussed under Impact 4.10-2, noise sources at the KP Medical Center would consist of HVAC units, loading docks, emergency sirens, and helicopter activity associated with the helistop. Although some of these noise sources could potentially exceed the City of Sacramento's noise standard for stationary sources, they would not be loud enough to exceed the City's interior noise standard of 45 dBA $L_{dn}$. Assuming a 25 dBA exterior-to-interior attenuation, existing residential buildings exposed to exterior noise levels of 70 dBA $L_{dn}$ could result in interior noise levels that would exceed the City of Sacramento's interior noise standard of 45 dBA $L_{dn}$. If the HVAC units were to run continuously for a 24-hour period, residents located within 30 feet would be exposed to exterior noise levels that would exceed 70 dBA $L_{dn}$. There are no existing or planned residences located within 30 feet of the KP Medical Center site.

In addition, loading and unloading activities and ambulance sirens would not occur continuously over a 24-hour period and would not expose any residential receptor near the KP Medical Center to exterior noise levels that would exceed 70 dBA $L_{dn}$.

As illustrated in Figure 4.10-3, the 45 dBA CNEL contour at either proposed helistop locations would be completely contained within the KP Medical Center area, which would not expose the nearest residential receptor near the KP Medical Center to exterior noise levels that would exceed 70 dBA $L_{dn}$.

Since exterior noise levels would not exceed 70 dBA $L_{dn}$ at existing or proposed sensitive land uses, interior noise levels from the operation of the KP Medical Center would result in a **less-than-significant impact.**

### *MLS Stadium*

As discussed under Impact 4.10-2, game noise, loud voices and noise generated by departing patrons, and/or outdoor amplified sound systems associated with up to seven concerts at the MLS Stadium could result in substantial noise during the evening and nighttime hours (depending on the event timing). Estimated noise levels generated during these events at the proposed MLS Stadium would exceed the City of Sacramento exterior noise standards at the nearest existing

(e.g., Creamery, Globe Mills and single- and multi-family residences along D Street) and future (e.g., Blocks 56 and 69) residential receptors. Although onsite future (new) residential units located near the MLS Stadium would be subject to the latest Title 24 of the California Code of Regulations, which requires an interior noise standard of 45 dBA $L_{dn}$ in any habitable room and requires an acoustical analysis demonstrating how dwelling units have been designed to meet this interior standard, some older existing residential buildings in the vicinity of the MLS Stadium may not be designed to reduce the types of noise generated by the MLS Stadium to below 45 dBA $L_{dn}$. Therefore, event noise from the MLS Stadium could result in **potentially significant** interior noise at receptors in the vicinity of the MLS Stadium.

### *Stormwater Outfall*

As previously discussed under Impact 4.10-2, the nearest existing and planned residential receptors to the proposed Stormwater Outfall are located at distances well over 1,000 feet. Since the nearest sensitive receptor to the Stormwater Outfall site would be located over 1,000 feet, noise generated by the underground pumps and generators would not be loud enough to result in an increase in interior noise levels at the nearest residential receptor that would exceed 45 dBA $L_{dn}$. This impact would be **less than significant**.

### *Summary*

In summary, future (new) residential units within the RSP Area would be required to meet the latest Title 24 of the California Code of Regulations, which requires an interior noise standard of 45 dBA $L_{dn}$ in any habitable room and requires an acoustical analysis demonstrating how dwelling units have been designed to meet this interior standard. However, there could be older existing residential buildings (e.g., Creamery, Globe Mills and single- and multi-family residences along D Street) near the MLS Stadium that would be exposed to event noise (i.e., amplified sound, game noise) that could result in interior noise levels exceeding 45 dBA $L_{dn}$. This would result in a **significant impact.**

Mitigation Measure

Mitigation Measure 4.10-3 is different from those discussed in the 2007 RSP EIR. The mitigation measures listed below add specific requirements related to the loading docks at onsite commercial uses and amplified sound and game noise that would be associated with the proposed MLS Stadium.

**Mitigation Measure 4.10-3(a) (RSPU)**

*Prior to the issuance of building permits for residential projects within the RSP Area, the City shall require project applicants for residential development to submit a detailed noise study, prepared by a qualified acoustical consultant, to identify design measures necessary to achieve the City interior standard of 45 Ldn in the proposed new residences. The study shall be submitted to the City for review and approval. Design measures such as the following could be required, depending on the specific findings of the noise study: double-*

*paned glass windows facing noise sources; solid-core doors; increased sound insulation of exterior walls (such as through staggered-or double-studs, multiple layers of gypsum board, and incorporation of resilient channels); weather-tight seals for doors and windows; or sealed windows with an air conditioning system installed for ventilation. This study can be a separate report, or included as part of the Noise and Vibration Reduction Plan for the proposed projects. The building plans submitted for building permit approval shall be accompanied by certification of a licensed engineer that the plans include the identified noise-attenuating design measures and satisfy the requirements of this mitigation measure.*

**Mitigation Measure 4.10-3(b) (MLS)**

*Implement Mitigation Measure 4.10-2(b) to minimize noise from outdoor amplified sound systems.*

**Impact Significance After Mitigation:** Implementation of the **Mitigation Measure 4.10-3(a) and 3(b)** would ensure that future residences are designed such that interior noise levels would not exceed the City standard of 45 $L_{dn}$. This impact would be considered **less than significant**.

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**Impact 4.10-4: Construction of the proposed projects could expose existing and/or planned buildings, and persons within, to vibration that could disturb people and damage buildings.**

The 2007 RSP EIR discussed construction vibration impacts under Impact 6.8-4 on pages 6.8-22 and 6.8-23. Impact pile drivers would have been required for the construction of the foundations of high-rise structures within the RSP Area. The 2007 RSP EIR assumed that impact pile drives would be used near onsite residential receptors and historic structures that would result in either an annoyance or building damage. The analysis concluded that future sensitive land uses within the RSP Area and the existing historic structures could be affected by impact pile driving during construction of projects within the RSP Area. This was determined to be a significant impact.

### *Railyards Specific Plan Update*

Construction of the structures proposed under the proposed RSPU could require the use of equipment or vehicles that could expose nearby sensitive receptors to vibrations levels that may result in an annoyance or building damage. Because construction activities within the RSP Area are anticipated to take place on a frequent basis over the next 20 or more years, these activities would be considered a continuous/frequent intermittent vibration source.

According to the Caltrans' *Transportation and Construction Vibration Guidance Manual*, the building damage threshold for historic and some older buildings is 0.25 PPV (in/sec) and the vibration threshold where vibration level increases are considered distinctly perceptible is 0.04

PPV (in/sec) for continuous/frequent intermittent sources.[29] Historic buildings and resources in the vicinity of the RSP Area include the historic Depot Building at the Sacramento Valley Station, the Central Shops buildings located just north of the Depot District, historic buildings off-site at the Sacramento River Water Treatment Plant, and historic structures located to the south in the Alkali Flat neighborhood and Old Sacramento.

Ground-borne vibration from grading, excavation, building construction, and impact pile driving activities at the RSP Area could produce substantial vibration at nearby sensitive receptors, including structures themselves. The extent to which these receptors would be affected depends largely on soil conditions, building design and materials, construction techniques employed, distance from the construction site to the structure, the age and condition of the structure, and the receptor's location in the building.

Typical reference vibration levels for various pieces of equipment are listed below in **Table 4.10-15**. During grading and building construction, the highest vibration levels would be generated by large bulldozers where building damage could occur within 13 feet of historic and some older buildings. There are no existing buildings outside of the RSP Area located within 13 feet of onsite grading or building activities. However, there are existing historic structures located in Blocks 20, 24, 25, 26, 27, 28 and 29 that could be located within 13 feet from onsite grading and building construction, which could result in building damage.

**TABLE 4.10-15.**
**VIBRATION VELOCITIES FOR CONSTRUCTION EQUIPMENT**

| Equipment/Activity | PPV at 25 ft (inches/second)[a] |
|---|---|
| Large Bulldozer | 0.089 |
| Hoe Ram | 0.089 |
| Loaded Trucks | 0.076 |
| Pile Driver (Impact) | 0.644 |
| Pile Driver (Sonic) | 0.170 |
| Caisson Drilling (represents Auger Drilling Pile Installation)[d] | 0.089 |

SOURCE: Federal Transit Administration, 2006. Transit Noise and Vibration Impact Assessment. May 2006 (Table 12-2, p. 12-12).

During foundation pile installation, the highest vibration levels would be generated by impact pile drivers where building damage to historic and some older buildings could occur within 47 feet. There are no existing buildings outside of the RSP Area located within 47 feet of where onsite impact pile driving would occur. However, the construction of Blocks 22 and 23 could require the use of an impact pile driver during building construction. Blocks 20, 24 and 27 would be located within 47 feet from Blocks 22 and 23. If impact pile driving is required during the construction of

[29] California Department of Transportation, 2013. *Transportation and Construction Vibration Guidance manual.* September 2013.

Blocks 22 and 23, the historic structures at Blocks 20, 24 and 27 would be exposed to vibration levels that would result in building damage.

In regards to human annoyance, sensitive receptors located within 40 feet of grading or 148 feet of impact pile driving activities would be exposed to construction vibration levels that could result in an annoyance. There are no existing offsite sensitive uses located within 148 feet from where onsite building or onsite building construction would occur. However, as the RSPU is incrementally built out over time, future residential buildings constructed in earlier phases of construction could be occupied and could be exposed to construction noise from subsequent construction phases. These future RSP Area residences could be located within 148 feet of onsite construction activities and could to be exposed to vibration levels that would result in an annoyance.

While construction-related vibration would be limited to the duration of the construction schedule, due to the close proximity of onsite future receptors and historic structures to construction activities, vibration levels could exceed the building damage and human annoyance thresholds (see Table 4.10-15). This would be a **short-term potentially significant impact**.

#### Railyards Specific Plan Update Land Use Variant

Construction of the RSPU Land Use Variant would have the identical impacts as those discussed under the RSPU. Under the Land Use Variant, the major medical center and the sports and entertainment stadium would be replaced with a mixture of residential and non-residential uses. The construction of the RSPU Land Use Variant would have very similar construction equipment, phasing, and durations as those discussed under the RSPU. Within the RSP Area, construction activities could expose future sensitive receptors to vibration levels that would result in human annoyance, and/or damage to historic structures. Therefore, construction vibration is considered to be a **short-term potentially significant impact**.

### *KP Medical Center*

The highest vibration levels would be generated during foundation pile installation where an impact pile driver would be used. As previously discussed, although the future KP Medical Center buildings have yet to be designed, use of impact pile driving may be required. In such an event, during foundation pile installation, historic and some older buildings located within 47 and 148 feet would be exposed to vibration levels that would result in building damage and human annoyance, respectively. There are no existing sensitive land uses or historic structures located within 148 feet from the KP Medical Center site. However, under the proposed RSPU there are planned residential receptors that could be located within 148 feet of the KP Medical Center; during foundation pile installation these receptors could be exposed vibration levels that could result in human annoyance or building damage. Therefore, construction vibration is considered to be a **short-term potentially significant impact**.

### *MLS Stadium*

The highest vibration levels during the construction of the MLS Stadium would be generated during foundation pile installation where impact pile drivers may be employed. As previously discussed, during foundation pile installation, historic and some older buildings located within 47 feet and 148 feet would be exposed to vibration levels that would result in building damage and human annoyance, respectively. There are no existing sensitive receptors or historic structures located within 148 feet from the MLS Stadium site that would be exposed to vibration levels that would result in human annoyance and/or building damage. However, there are planned residential and non-residential uses planned in Block 56 (west of the MLS Stadium and across 8th Street) and Blocks 49 and 50 (located south of the MLS Stadium, across Railyards Boulevard) that could be located as close as 68 and 71 feet the MLS Stadium, respectively. Although the buildings proposed in Blocks 56, 49 and 50 would not be close enough to construction activities at the MLS Stadium that would result in building damage; they could be exposed to vibration levels that would result in an annoyance. Therefore, construction vibration is considered to be a **short-term potentially significant impact**.

### *Stormwater Outfall*

The highest vibration levels during the construction of the proposed Stormwater Outfall would be generated during cofferdam construction where an impact driver would be used. As previously discussed, during impact pile driving, historic and some older buildings located within 47 feet and 148 feet would be exposed to vibration levels that could result in building damage and human annoyance, respectively. There are no existing sensitive receptors, or historic structures located within 148 feet from the proposed Stormwater Outfall that would be exposed to vibration levels that would result in human annoyance or building damage. The nearest planned residential building located near the proposed Stormwater Outfall would be located within Block 35. The planned residential buildings in Block 35 would be located beyond 148 feet from the proposed Stormwater Outfall. Therefore, construction vibration is considered to be a **less-than-significant impact**.

### *Summary*

The construction of the Outfall would require the use of an impact pile driver. However, there is no existing or planned sensitive land uses located within 148 feet from the proposed Stormwater Outfall would be exposed to vibration levels that would result in human annoyance and building damage. Since there are no existing or planned sensitive land uses, or historic buildings within 148 feet of the Stormwaster Outfall, this impact would be **less than significant**.

The construction activities that would be associated with the RSPU, RSPU Land Use Variant, KP Medical Center, and MLS Stadium may require the use of impact pile drivers during foundation pile installation. Impact pile driving would be temporary and intermittent. Due to the close proximity of future sensitive land uses associated with the RSPU and RSPU Land Use Variant to the construction activity areas, vibration levels generated during impact pile driving could exceed the applied vibration thresholds for human annoyance and/or building damage at nearby future

planned sensitive receptors and existing historic structures. This would result in a **short-term potentially significant impact**. The magnitude of this impact is the same as described in Impact 6.8-4 in the 2007 RSP EIR.

Mitigation Measures

Mitigation Measure 4.10-4 described below are similar to those discussed in Mitigation Measure 6.8-4 on page 6.8-23 of the 2007 RSP EIR. No mitigation would be required for construction of the Stormwater Outfall.

**Mitigation Measure 4.10-4 (RSPU, KPMC, MLS)**

*Prior to the issuance of any building permit for each phase of project development, the project applicant shall develop a Vibration Reduction Plan in coordination with an acoustical consultant, geotechnical engineer, and construction contractor, and submit the Plan to the City Chief Building Official for approval. The Plan shall include the following elements:*

*1) To mitigate vibration, the Plan shall include measures such that surrounding buildings will be exposed to less than 80 VdB and 83 VdB where people sleep and work, respectively, and less than 0.25 PPV for historic buildings to prevent building damage.*

*Measures and controls shall be identified based on project-specific final design plans, and may include, but are not limited to, some or all of the following:*

*2) Buffer distances and types of equipment selected to minimize vibration impacts during construction at nearby receptors in order to meet the specified standards.*

*3) Implement a vibration, crack, and line and grade monitoring program at existing historic buildings located within 47 feet of construction activities. The following elements shall be included in this program:*

*a) During building construction:*

*i) The construction contractor shall regularly inspect and photograph crack gauges, maintaining records of these inspections to be included in post-construction reporting. Gauges shall be inspected every two weeks, or more frequently during periods of active project actions in close proximity to crack monitors, such as during the building construction of blocks 23 and 24.*

*ii) The construction contractor shall collect vibration data from receptors and report vibration levels to the City Chief Building Official on a*

*monthly basis. The reports shall include annotations regarding project activities as necessary to explain changes in vibration levels, along with proposed corrective actions to avoid vibration levels approaching or exceeding the established threshold.*

*iii) With regards to historic structures, if vibration levels exceed the threshold and monitoring or inspection indicates that the project is damaging the building, the historic building shall be provided additional protection or stabilization. If necessary and with approval by the City Chief Building Official, the construction contractor shall install temporary shoring or stabilization to help avoid permanent impacts. Stabilization may involve structural reinforcement or corrections for deterioration that would minimize or avoid potential structural failures or avoid accelerating damage to the historic structure. Stabilization shall be conducted following the Secretary of Interior Standards Treatment of Preservation. This treatment shall ensure retention of the historical resource's character-defining features. Stabilization may temporarily impair the historic integrity of the building's design, material, or setting, and as such, the stabilization must be conducted in a manner that will not permanently impair a building's ability to convey its significance. Measures to shore or stabilize the building shall be installed in a manner that when they are removed, the historic integrity of the building remains, including integrity of material.*

*b) Post-construction*

*i) The applicant (and its construction contractor) shall provide a report to the City Chief Building Official regarding crack and vibration monitoring conducted during demolition and construction. In addition to a narrative summary of the monitoring activities and their findings, this report shall include photographs illustrating the post-construction state of cracks and material conditions that were presented in the pre-construction assessment report, along with images of other relevant conditions showing the impact, or lack of impact, of project activities. The photographs shall sufficiently illustrate damage, if any, caused by the project and/or show how the project did not cause physical damage to the historic and non-historic buildings. The report shall include annotated analysis of vibration data related to project activities, as well as summarize efforts undertaken to avoid vibration impacts. Finally, a post-construction line and grade survey shall also be included in this report.*

ii) *The project applicant (and its construction contractor) shall be responsible for repairs from damage to historic and non-historic buildings if damage is caused by vibration or movement during the demolition and/or construction activities. Repairs may be necessary to address, for example, cracks that expanded as a result of the project, physical damage visible in post-construction assessment, or holes or connection points that were needed for shoring or stabilization. Repairs shall be directly related to project impacts and will not apply to general rehabilitation or restoration activities of the buildings. If necessary for historic structures, repairs shall be conducted in compliance with the Secretary of Interior Standards Treatment of Preservation. The project applicant shall provide a work plan for the repairs and a completion report to ensure compliance with the SOI Standards to the City Chief Building Official and City Preservation Director for review and comment.*

**Impact Significance After Mitigation:** Implementation of **Mitigation Measure 4.10-4** would ensure that construction activities at the proposed project sites would not result in building damage at the nearest historic building structures, and would reduce human disturbance to the extent feasible. However, the proposed projects would still result in infrequent but substantial vibration during construction that would likely result in disturbance impacts at the nearest onsite sensitive land uses if construction activities were to occur within 148 feet of receptors at night. While implementation of the mitigation measures described above would avoid building damage and would reduce vibration impacts to surrounding receptors, it is likely that construction activities would still adversely affect surrounding receptors at times during construction on the proposed project sites. Consequently, this impact would be **significant and unavoidable** during the short-term duration of construction activities on the proposed project sites.

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**Impact 4.10-5: The residential, non-residential, and mixed-use buildings constructed pursuant to the RSPU could be exposed to vibration levels due to existing rail operations and/or I-5 traffic.**

As discussed under *Methods and Assumptions* above, the California Supreme Court has recently held that CEQA does not require an EIR to consider impacts of the existing environment on the future project. Impact 6.8-5 of the 2007 RSP EIR addressed these types of impacts where the future proposed structures and sensitive receptors under the 2007 RSP would be located near the existing UPRR rail line, Sacramento RT light rail line, and I-5. Although not required by CEQA, those impacts are addressed here to demonstrate how the effects of the proposed projects would compare to those under the 2007 RSP.

The 2007 RSP EIR discussed vibration impacts to sensitive receptors within the RSP Area from the UPRR rail line, RT light rail, and I-5 under Impact 6.8-5 on pages 6.8-23 through 6.8-28. The 2007 RSP EIR concluded that there are areas within each District that could be subjected to disruptive levels of vibration from rail traffic along the UPRR and RT light rail lines, and vehicular traffic along I-5, which would result in a significant impact. Vibration impacts were assessed based on the vibration impact screening distances provided in the FTA's Guidance Manual.[30] In addition, the 2007 RSP EIR evaluated vibration impacts associated with the proposed realignment of the UPRR tracks. However, since the publication of the 2007 RSP EIR, the UPRR rail line tracks have been relocated to their present alignment. Therefore, this SEIR only evaluates the vibration impacts from the current UPRR alignment on future uses.

## *Railyards Specific Plan Update*

### Sacramento Regional Transit

Under the RSPU, residential and commercial land uses are proposed to be located adjacent to the existing RT Green Line tracks along 7th Street, between F Street and North B Street. According to the FTA's *Guidance Manual for Transit Noise and Vibration Impact Assessment*,[31] vibration impacts from rail traffic must be assessed if a project is located within 150 feet of a light rail transit line. There are proposed residences located in Blocks 56 and 69 that could be as close as 30 feet to the centerline of the RT line. From this distance, the residential units in Blocks 56 and 69 could be exposed to perceptible vibration levels from RT light rail pass-by events.

Based on the RT light rail transit schedule for the 7th & Richards/Township 9 Station, there are currently 59 RT light rail train pass-by events per day along 7th Street, between F Street and North B Street. The FTA defines occasional events as between 30 to 70 vibration events of the same source per day. Since the RT light rail trains pass by the proposed residential uses along 7th Street 59 times per day, the RT light rail train pass-by events would be considered occasional.[32] The vibration threshold for occasional transit events that would be disruptive to residences and buildings where people normally sleep is 75 VdB. The distance between the RT Green Line light rail centerline along 7th Street, between F Street and North B Street, to its nearest proposed residential units in Blocks 56 and 69 is approximately 30 feet. Based on the FTA's typical ground-surface vibration levels, a light rail train traveling at a speed of 50 miles per hour (mph) would generate a vibration level of approximately 77 VdB from a distance of 30 feet. According to the Sacramento Regional Transit, the rail speed north of the Railyards Boulevard along the RT Green Line is limited to 10 mph.[33] Using the train speed adjusted found in the FTA's *Guidance Manual for Transit Noise and Vibration Impact Assessment*,[34] the vibration levels at the residential units located in Blocks 56 and 69 would be approximately 59 VdB, which is below the

30 Federal Transit Administration, 2006. Transit Noise and Vibration Impact Assessment. May 2006.

31 Federal Transit Administration, 2006. Transit Noise and Vibration Impact Assessment. May 2006. pp. 9-4.

32 Sacramento Regional Transit, 2016. RT Bus & Light Rail Routes & Schedules. Available: http://www.sacrt.com/schedules/current/routes/R519.htm. Accessed March 2016.

33 "Question about Green Line Speeds." Message to Vern Barnhart. E-mail communication, April 5, 2016..

34 Federal Transit Administration, 2006. Transit Noise and Vibration Impact Assessment. May 2006. pp. 10-9.

FTA impact threshold of 75 VdB for occasional transit vibration events. Therefore, this would result in a **less-than-significant impact** on future proposed residences**.** The magnitude of this impact is the same as described for Impact 6.8-4 in the 2007 RSP EIR.

### UPRR Rail line

The proposed sensitive land uses under the RSPU would be located adjacent to the existing UPRR line between Jibboom Street and 12th Street. Based on the Amtrak schedule at the Sacramento Amtrak Station, there are currently 29 Amtrak train pass-by events along this segment of the UPRR line per day. The train schedule for the existing heavy freight traffic along the UPRR rail line is unknown at this time. The proposed buildings that would be located at Blocks 20, 27, 28, and 29 would be particularly sensitive because they may include exhibit and museum uses. These sensitive commercial buildings would be considered to be a Category 3 land use and would be located approximately 45 feet from the UPRR rail racks. According to the FTA *Guidance Manual for Transit Noise and Vibration Impact Assessment*, the vibration threshold for Category 3 land uses is 78 VdB for occasional events and the typical ground-surface vibration levels for locomotive powered passenger or freight trains traveling at a speed of 50 mph and at a distance of 45 feet is approximately 87 VdB.[35] It is assumed that the transit and freight trains would be traveling at a speed of 30 mph. Using an FTA speed correction factor, the adjusted vibration level for a locomotive powered passenger or freight train traveling at a speed of 30 mph at a distance of 45 feet is 81 VdB, which is above the FTA impact threshold of 78 VdB for occasional transit vibration events. Therefore, this would result in a **significant impact**. The magnitude of this impact is the same as described in Impact 6.8-5 in the 2007 RSP EIR.

There are residential units proposed in Blocks 35, 49 and 50 that could be located near the UPRR rail tracks. Since the UPRR trains pass-bys are unknown, the UPRR pass-by events would be considered occasional. The vibration threshold for occasional transit events that would be disruptive to residences and buildings where people normally sleep is 75 VdB. According to the FTA *Guidance Manual for Transit Noise and Vibration Impact Assessment*, the typical ground-surface vibration levels for locomotive powered passenger or freight trains traveling at a speed of 50 mph and at a distance of 113 feet is approximately 75 VdB.[36] The residential units proposed in Blocks 35, 49 and 50 could be located as close as 113 feet from the centerline of the UPRR rail tracks. Therefore, this would result in a **significant impact.**

### Interstate 5

The sensitive land uses under the proposed RSPU would be located near the existing I-5 roadway along the western boundary of the RSP Area. On June 2007, Wilson, Ihrig, and Associates Inc. performed a series of vibration measurements near the columns that support the I-5 viaduct (see Appendix K of the 2007 RSP EIR). The result of the vibration measurements showed that the criterial distance for potential impacts from the columns supporting the I-5 roadway is 70 feet. There are residential units located in Block 35 that could be located within 70 feet from the I-5

35 Federal Transit Administration, 2006. Transit Noise and Vibration Impact Assessment. May 2006. pp. 8-3.

36 Federal Transit Administration, 2006. Transit Noise and Vibration Impact Assessment. May 2006. pp. 8-3.

support columns. These residential units could be exposed vibration levels generated from vehicle traffic on I-5 would result in a vibration impact. Therefore, this would result in a **significant impact.**

#### Railyards Specific Plan Update Land Use Variant

The placement of residential and commercial land uses under the RSPU Land Use Variant would have similar effects as those discussed under the RSPU. Under the Land Use Variant, the KP Medical Center and the MLS Stadium would be replaced with a mixture of residential and non-residential land uses. The buildings in the Central Shops Historic District in Blocks 20, 27, 28, and 29 and residential units in Blocks 35, 49 and 50 would be exposed to vibration levels from transport and freight pass-by events along the UPRR that would exceed the FTA vibration threshold. Therefore, this would result in a **significant impact**. The magnitude of this impact is the same as described in Impact 6.8-5 in the 2007 RSP EIR.

### *KP Medical Center*

On June2007, Wilson, Ihrig and Associates Inc. performed a series of vibration measurements near the columns supporting the I-5 viaduct (see Appendix K of the 2007 RSP EIR). The result of the vibration measurements showed that the criterial distance for potential impacts from the columns supporting the I-5 roadway is 70 feet. Since the buildings within the KP Medical Center area would be located at least 100 feet from the nearest I-5 support column, it is not expect that vehicle traffic on I-5 would result in a vibration impact. Therefore, there would be **no impact**.

### *MLS Stadium*

The proposed MLS Stadium would be located approximately 700 and 300 feet from the RT light rail and UPRR center lines, respectively. At these distances, vibration levels from commuter, freight, and light rail pass-by events would perceivable and would not disrupt the daily operations at, or affect the structural integrity of, the MLS Stadium. In addition, there would be no sensitive receptors within the proposed MLS Stadium. Therefore, there would be **no vibration impacts** to the MLS Stadium by nearby rail transit.

### *Stormwater Outfall*

The proposed Stormwater Outfall would not include any sensitive land uses that would be impacted by vibration from either the I-5 support column or UPRR rail line. Therefore, vibration impacts to the Stormwater Outfall would result in a **less-than-significant impact**.

### *Summary*

There are proposed residential units in Blocks 35, 49 and 50 under the RSPU and RSPU Land Use Variant that could be placed within 113 feet of the UPRR rail line centerline. From this distance, these residential receptors could be exposed to vibration levels that would result in an annoyance. In addition, the proposed sensitive commercial buildings in Blocks 29, 27, 28 and 29 under the RSPU and the RSPU Land Use Variant could be exposed to vibration levels from freight train pass-by events along the UPRR rail line that would disrupt daily operations. As a

result, the vibration levels at these residential and sensitive commercial buildings would be considered significant. This impact would be the same as Impact 6.8-5 of the 2007 RSP EIR. The proposed KP Medical Center and MLS Stadium would be located near the I-5 support columns, as well as the UPRR and RT light rail tracks, but due to the long distances between the two sites and these existing vibration sources, the sites would not be exposed to vibration levels that would result in an impact. The proposed Stormwater Outfall would not include sensitive uses and as a result would result in no vibration impacts.

Mitigation Measures

Mitigation Measure 4.10-5 described below is similar to Mitigation Measure 6.8-5 on pages 6.8-28 and 6.8-29 of the 2007 RSP EIR. Items (a) and (b) of Mitigation 6.8-5 of the 2007 RSP EIR are not included as they relate to construction vibration mitigation during track relocation. Since the relocation of the UPRR has already been completed, these items are no longer relevant.

**Mitigation Measure 4.10-5 (RSPU)**

*a) The historic structures in the Central Shops Historic District shall be stabilized using methods that would protect against vibration levels identified in the screening analysis (shown in Figure 6.8-3 of the 2007 RSP EIR).*

*b) Prior to design review, the applicant shall have a certified vibration consultant prepare a site-specific vibration analysis for residential uses and historic structures that are within the screening distance (shown in Figure 6.8-3 of the 2007 RSP EIR) for freight and passenger trains or light rail trains. The analysis shall detail how the vibration levels at these receptors would meet the applicable vibration standards to avoid potential structural damage and human annoyance. The results of the analysis shall be incorporated into project design.*

**Impact Significance After Mitigation:** Implementation of **Mitigation Measure 4.10-5** would reduce impacts to a **less-than-significant** level by ensuring that vibration levels do not cause substantial annoyance.

## Cumulative Impacts

The geographic context for changes in the noise and vibration environment due to development of the proposed projects (i.e., RSPU, RSPU Land Use Variant, KP Medical Center, MLS Stadium, and Outfall) would be localized in mainly an urban area of the City of Sacramento, as well as along roadways that would serve the proposed projects. In order to contribute to a cumulative construction noise impact, another project in close proximity would have to be constructed at the same time as the proposed projects. There are numerous development projects in several locations near the proposed projects, currently in the planning stages, that could be constructed and operational in the foreseeable future. The largest projects near the proposed project sites are the I Street Bridge Replacement project and the Powerhouse Science Center, Vanir Tower (6th/J

Street), the Creamery at Alkali Flat, Township 9 (later phases), and other potential future development at Downtown Commons.

The cumulative context provided in Chapter 6.8 (Noise and Vibration) of the 2007 RSP EIR stated that "Noise generated by project construction, including vibration, would be temporary, and therefore would not add to the permanent environment." Prior to the publication of the 2007 RSP EIR, there were no known cumulative projects near the RSP Area that would be constructed at the same time. Since the publication of the 2007 RSP EIR, there has been new cumulative projects proposed near the RSP Area that could be constructed at the same time as the RSPU. The construction of these cumulative projects could elevate construction noise higher than what was previously analyzed in this chapter. Therefore, cumulative construction impacts are discussed in Impact 4.10-6. Future stationary noise sources would not contribute to cumulative noise impacts at distant locations and are not evaluated on a cumulative level. This is consistent with the conclusions found on page 6.8-29 of the 2007 RSP EIR.

Increases in vehicle trips due to proposed project developments would combine with other adjacent development projects in the City of Sacramento and would result in a cumulative increase in traffic along area roadways as evaluated as part of the transportation and circulation for this project (and presented in section 4.12 of this SEIR), thus affecting noise levels within the City.

**Impact 4.10-6: The proposed projects would result in exposure of people to cumulative increases in construction noise levels.**

The 2007 RSP EIR considered construction noise as being only temporary and would not contribute to the permanent noise environment. However, since the publication of the 2007 RSP EIR, there have been numerous projects near the proposed project areas that are currently in the design phase, which could be constructed at the same time as the proposed projects. As previously discussed in Impact 4.10-1, construction activities could adversely affect both on- and off-site noise-sensitive land uses if located within close proximity to where project-related construction would occur. If project-related activities were to coincide with another development, such as the I Street Bridge Replacement project, the combined effect could result in the exposure of on- and off-site noise-sensitive land uses to higher noise levels than what was predicted under the proposed project. Although considerable uncertainty exists regarding the construction schedules for the proposed projects as well as cumulative projects, construction noise associated with those projects in combination with the proposed projects would be considered a temporary **significant cumulative impact** and the contribution of the proposed projects would be cumulatively considerable.

Mitigation Measures

Mitigation Measure 4.10-6 described below are the same as those discussed in Mitigation measure 6.8-1 on pages 6.8-17 through 6.8-18 of the 2007 RSP EIR.

**Mitigation Measure 4.10-6 (RSPU, KPMC, MLS)**

*Implement Mitigation Measure 4.10-1.*

**Impact Significance after Mitigation:** Implementation of Mitigation Measure 4.10-6 would reduce the contribution of the proposed projects to cumulative construction noise levels at the existing noise-sensitive land uses located near and within the RSP Area. With the implementation of **Mitigation Measure 4.10-6** listed above, the contribution of the proposed projects to this cumulative impact would be less than considerable, and the impact would be reduced to a **less-than-significant** level.

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**Impact 4.10-7: The proposed projects would contribute to cumulative construction that could expose existing and/or planned buildings, and persons within, to significant vibration.**

As previously discussed under Impact 4.10-2, the construction activities within the proposed projects may require the use of impact pile drivers during foundation pile installation. Impact pile driving would be temporary and intermittent. Due to the close proximity of existing and future sensitive receptors to the onsite construction activity areas, vibration levels generated during impact pile driving would exceed the applied vibration threshold for human annoyance and building damage at nearby future planned sensitive receptor's and historic structures. If project-related activities were to coincide with another development in close physical proximity (within approximately 150 feet), the combined effect could result in the exposure of sensitive land uses or historic structures to higher vibration levels than what was predicted for the proposed projects. Although considerable uncertainty exists regarding the construction schedules for the proposed projects as well as cumulative projects, construction vibration associated with cumulative projects in combination with the proposed projects would be considered a temporary **significant cumulative impact** and the proposed project's contribution would be cumulatively considerable.

Mitigation Measures

Mitigation Measure 4.10-7 described below is the same as those discussed in Mitigation measure 6.8-4 on page 6.8-23 of the 2007 RSP EIR.

**Mitigation Measure 4.10-7 (RSPU, KPMC, MLS)**

*Implement Mitigation Measure 4.10-4*

**Impact Significance after Mitigation:** Implementation of Mitigation Measure 4.10-7 would ensure that construction activities in the RSP Area would not result in building damage at the nearest historic and non-historic building structures, and would reduce human disturbance to the extent feasible. While implementation of the mitigation measures described above would avoid vibration-caused building damage and would reduce vibration impacts to surrounding receptors, it

is likely that the combined cumulative construction activities could still adversely affect surrounding sensitive land uses. With the implementation of **Mitigation Measure 4.10-7** listed above, the contribution of the proposed project to this cumulative impact would remain considerable, and the impact would remain **significant and unavoidable**.

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**Impact 4.10-8: The proposed projects would contribute to cumulative increases in traffic and rail noise levels.**

The 2007 RSP EIR discussed cumulative noise increases at on- and off-site sensitive receptors due to the RSP's contribution to future traffic and rail use. The 2007 RSP EIR concluded that the combination of increased rail ridership and the introduction of the high speed train project would result in future rail noise increasing by more than 3 dB. Furthermore, the 2007 RSP EIR found that the development of the RSP would increase future cumulative traffic noise by 3 dB, resulting in a significant cumulative impact. Since the proposed projects would not affect the ridership or freight transport along the UPRR rail line, this impact is not evaluated in this SEIR.

On-road traffic associated with the proposed projects would be the primary source that would contribute to the cumulative noise environment. Noise projections were made using the FHWA Noise Prediction Model for cumulative roadway volumes provided by Fehr and Peers, for those road segments that would experience the greatest increase in traffic volume and that would pass by sensitive receptors. The segments analyzed and results of the modeling are shown in **Table 4.10-16** (daily $L_{dn}$).

As shown in Table 4.10-16, the cumulative plus project on-road traffic noise would not result in noise levels that would exceed the normally acceptable $L_{dn}$ for Urban Residential Infill and Mixed-Use Projects listed in Table 4.10-8 along the majority of modeled roadways. The proposed projects in conjunction with cumulative and cumulative plus project would result in daily $L_{dn}$ noise exposure that would not exceed the allowable noise incremental increases detailed in Table 4.10-9 at residential uses along any of the roadway segments analyzed. Therefore, the proposed projects would result in a **less than considerable** contribution to the daily $L_{dn}$ impacts at existing and planned residential uses.

Mitigation Measure

None required.

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**TABLE 4.10-16.**
**CUMULATIVE $L_{dn}$ TRAFFIC NOISE LEVELS ALONG STREETS IN THE PROJECT VICINITY**

| | Traffic Noise Level, dBA, $L_{dn}$[1] | | | | | |
|---|---|---|---|---|---|---|
| **Roadway Segment** | **Cumulative** | **Cumulative + Cumulative Plus Project** | **Incremental Increase** | **Incremental Increase Significance Threshold2** | **Significant? (Yes or No)[2]** | **Exceed 70 dBA?** |
| Richards Boulevard | | | | | | |
| between Bercut Drive and N 3rd Street | 68 | 68 | 0 | 1 | No | No |
| between N 3rd Street and Sequoia Pacific Boulevard | 68 | 68 | 0 | 1 | No | No |
| between Sequoia Pacific Boulevard and N 5th Street. | 67 | 67 | 0 | 1 | No | No |
| between north 5th Street and N 7th Street | 68 | 68 | 0 | 1 | No | No |
| between N 7th Street and N 10th Street | 68 | 68 | 0 | 1 | No | No |
| between N 10th Street and Dos Rios Street | 69 | 69 | 0 | 1 | No | No |
| between Dos Rios Street and N 12th Street | 69 | 69 | 0 | 1 | No | No |
| 12th Street | | | | | | |
| between Sunbeam Avenue and Dos Rios Street | 66 | 67 | 1 | 1 | No | No |
| between N B Street and E Street | 66 | 66 | 0 | 1 | No | No |
| between E Street and F Street | 64 | 64 | 0 | 2 | No | No |
| Dos Rios Street | | | | | | |
| between Richards Boulevard and N 12th Street | 56 | 56 | 0 | 3 | No | No |
| B Street | | | | | | |
| between Dos Rios Street and 7th Street | 64 | 65 | 1 | 2 | No | No |
| west of 7th Street | 64 | 65 | 1 | 2 | No | No |
| Bannon Street | | | | | | |
| between Sequoia Pacific Boulevard and Bercut Drive | 60 | 60 | 0 | 2 | No | No |
| Sequoia Pacific Boulevard | | | | | | |
| between Richards Boulevard and Bannon Street | 63 | 63 | 0 | 2 | No | No |
| south of Bannon Street | 63 | 64 | 1 | 2 | No | No |
| Bercut Drive | | | | | | |
| between Bannon Street and South Park Street | 60 | 61 | 1 | 2 | No | No |
| between South Park Street and Railyards Boulevard | 61 | 63 | 2 | 2 | No | No |
| between Railyards Boulevard and Camille Lane | 59 | 61 | 2 | 3 | No | No |
| South Park Street | | | | | | |
| between Bercut Drive and 5th Street | 61 | 62 | 1 | 2 | No | No |
| between 5th street and Judah Street | 61 | 59 | -2 | 2 | No | No |
| between Judah Street and 6th Street | 61 | 59 | -2 | 2 | No | No |
| between 6th Street and 7th Street | 61 | 62 | 1 | 2 | No | No |

**TABLE 4.10-16.**
**CUMULATIVE $L_{dn}$ TRAFFIC NOISE LEVELS ALONG STREETS IN THE PROJECT VICINITY**

| | Traffic Noise Level, dBA, $L_{dn}$[1] | | | | | |
|---|---|---|---|---|---|---|
| **Roadway Segment** | **Cumulative** | **Cumulative + Cumulative Plus Project** | **Incremental Increase** | **Incremental Increase Significance Threshold2** | **Significant? (Yes or No)[2]** | **Exceed 70 dBA?** |
| Jibboom Street | | | | | | |
| between I-5 and Railyards Boulevard | 63 | 63 | 0 | 2 | No | No |
| Railyards Boulevard | | | | | | |
| between Jibboom Street and Bercut Drive | 68 | 69 | 1 | 1 | No | No |
| between Bercut Drive and KP Medical Center Dropoff | 68 | 67 | -1 | 1 | No | No |
| between KP Medical Center Dropoff and KP Medical Center Entry | 68 | 67 | -1 | 1 | No | No |
| between KP Medical Center Entry and 5th Street | 68 | 66 | -2 | 1 | No | No |
| between 5th Street and Judah Street | 67 | 66 | -1 | 1 | No | No |
| between Judah Street and 6th Street | 67 | 66 | -1 | 1 | No | No |
| between 6th Street and 7th Street | 67 | 67 | 0 | 1 | No | No |
| between 7th Street and 8th Street | 65 | 65 | 0 | 1 | No | No |
| between 8th street and 10th Street | 65 | 64 | -1 | 1 | No | No |
| 10th Street | | | | | | |
| between Railyards Boulevard and B Street | 60 | 61 | 1 | 2 | No | No |
| between B Street and Richards Boulevard | 61 | 60 | -1 | 2 | No | No |
| north of Richards Boulevard | 59 | 59 | 0 | 3 | No | No |
| 7th Street | | | | | | |
| north of Richards Boulevard | 60 | 60 | 0 | 2 | No | No |
| between Richards Boulevard and B Street | 63 | 63 | 0 | 2 | No | No |
| between B Street and South Park Street | 66 | 66 | 0 | 1 | No | No |
| between South Park Street and Railyards Blvd | 65 | 65 | 0 | 1 | No | No |
| between Railyards Blvd and F Street | 67 | 67 | 0 | 1 | No | No |
| between F St and G Street | 63 | 64 | 1 | 2 | No | No |
| between G Street and H Street | 64 | 64 | 0 | 2 | No | No |
| between H Street and I Street | 62 | 62 | 0 | 2 | No | No |
| between I Street and J Street | 62 | 62 | 0 | 2 | No | No |
| 8th Street | | | | | | |
| north of F Street | 58 | 58 | 0 | 3 | No | No |
| between F Street and H Street | 62 | 62 | 0 | 2 | No | No |
| between H Street and I Street | 62 | 62 | 0 | 2 | No | No |
| south of I Street | 63 | 63 | 0 | 2 | No | No |

**TABLE 4.10-16.**
**CUMULATIVE $L_{dn}$ TRAFFIC NOISE LEVELS ALONG STREETS IN THE PROJECT VICINITY**

| | Traffic Noise Level, dBA, $L_{dn}$[1] | | | | | |
|---|---|---|---|---|---|---|
| **Roadway Segment** | **Cumulative** | **Cumulative + Cumulative Plus Project** | **Incremental Increase** | **Incremental Increase Significance Threshold2** | **Significant? (Yes or No)[2]** | **Exceed 70 dBA?** |
| 5th Street | | | | | | |
| between B Street and South Park Street | 64 | 64 | 0 | 2 | No | No |
| between South Park Street and Railyards Boulevard | 64 | 64 | 0 | 2 | No | No |
| between Railyards Boulevard and Camille Lane | 65 | 63 | -2 | 1 | No | No |
| between Camille Lane and Stevens Street | 65 | 64 | -1 | 1 | No | No |
| between Stevens Street and H Street | 65 | 66 | 1 | 1 | No | No |
| between H Street and I Street | 64 | 65 | 1 | 2 | No | No |
| between I Street and J Street | 63 | 63 | 0 | 2 | No | No |
| south of J Street | 62 | 62 | 0 | 2 | No | No |
| Camille Lane | | | | | | |
| between Bercut Drive and HSB Drop Off | 62 | 63 | 1 | 2 | No | No |
| between HSB Drop Off and HSB Entry | 62 | 64 | 2 | 2 | No | No |
| between HSB Entry and 5th Street | 62 | 64 | 2 | 2 | No | No |
| between 5th Street and 6th Street | 62 | 63 | 1 | 2 | No | No |
| 6th Street | | | | | | |
| between B Street and South Park Street | 63 | 63 | 0 | 2 | No | No |
| between South Park Street and Railyards Boulevard | 63 | 63 | 0 | 2 | No | No |
| between Railyards Boulevard and Camille Lane | 65 | 63 | -2 | 1 | No | No |
| between Camille Lane and Stevens Street | 65 | 64 | -1 | 1 | No | No |
| between Stevens Street and H Street | 65 | 65 | 0 | 1 | No | No |
| between H Street and I Street | 64 | 63 | -1 | 2 | No | No |
| south of I Street | 64 | 64 | 0 | 2 | No | No |
| G Street | | | | | | |
| east of 7th Street | 61 | 61 | 0 | 2 | No | No |
| west of 7th Street | 63 | 63 | 0 | 2 | No | No |
| H Street | | | | | | |
| between 5th Street and 6th Street | 59 | 59 | 0 | 3 | No | No |
| between 6th Street and 7th Street | 60 | 61 | 1 | 2 | No | No |
| between 7th Street and 8th Street | 62 | 62 | 0 | 2 | No | No |
| east of 8th Street | 61 | 62 | 1 | 2 | No | No |

**TABLE 4.10-16.**
**CUMULATIVE $L_{dn}$ TRAFFIC NOISE LEVELS ALONG STREETS IN THE PROJECT VICINITY**

| | Traffic Noise Level, dBA, $L_{dn}$[1] | | | | | |
|---|---|---|---|---|---|---|
| **Roadway Segment** | **Cumulative** | **Cumulative + Cumulative Plus Project** | **Incremental Increase** | **Incremental Increase Significance Threshold2** | **Significant? (Yes or No)[2]** | **Exceed 70 dBA?** |
| I Street | | | | | | |
| west of 5th Street (Yolo County) | 60 | 60 | 0 | 2 | No | No |
| between 5th Street (Yolo County) and 3rd Street (Yolo County) | 63 | 63 | 0 | 2 | No | No |
| between 3rd Street (Yolo County) and Jibboom Street | 65 | 65 | 0 | 1 | No | No |
| between Jibboom Street and 5th Street | 65 | 65 | 0 | 1 | No | No |
| between 5th Street and 6th Street | 63 | 63 | 0 | 2 | No | No |
| between 6th Street and 7th Street | 62 | 62 | 0 | 2 | No | No |
| between 7th Street and 8th Street | 63 | 63 | 0 | 2 | No | No |
| east of 8th Street | 62 | 62 | 0 | 2 | No | No |
| J Street | | | | | | |
| between 3rd Street and 5th Street | 66 | 66 | 0 | 1 | No | No |
| between 5th Street and 7th Street | 66 | 66 | 0 | 1 | No | No |
| east of 7th Street | 65 | 65 | 0 | 1 | No | No |
| F Street | | | | | | |
| between 7th Street and 8th Street | 63 | 63 | 0 | 2 | No | No |
| between 8th Street and 12th Street | 62 | 62 | 0 | 2 | No | No |
| east of 12th Street | 61 | 61 | 0 | 2 | No | No |
| Tower Bridge Gateway | | | | | | |
| west of 5th Street (Yolo county) | 63 | 64 | 1 | 2 | No | No |
| between 5th Street (Yolo County) and South River Road | 63 | 63 | 0 | 2 | No | No |
| east of S River Road | 63 | 63 | 0 | 2 | No | No |

NOTES:

1. Noise levels were determined using FHWA Traffic Noise Prediction Model (FHWA RD-77-108).
2. Traffic noise increases at an existing sensitive use exceed the allowed incremental noise increase provided in Table 4.10-9 would result in a significant impact.
3. Future residences that are exposed to future traffic noise above the allowed City of Sacramento of 70 dBA $L_{dn}$ for an infill site would result in a significant impact.

NA = New roadway

Source: ESA, 2016

**Impact 4.10-9: Implementation of the proposed projects would contribute to cumulative increases in residential interior noise levels of 45 dBA $L_{dn}$ or greater.**

On-road traffic associated with the proposed projects would be the primary source that would contribute to the cumulative exterior, and thus interior, noise environment of existing and future residences. An exterior noise exposure of 70 dBA or greater would result in potentially incompatible interior noise for new urban infill sensitive receptors. The residential units proposed under the proposed projects would be subject to Title 24 of the California Code of Regulations, sound-rated assemblies would be required at the exterior facades of proposed project buildings.

Cumulative traffic would also result in noise exposure of existing residential receptors in the proposed project vicinity, as described above in Impact 4.10-8. For on-road transportation sources, the total roadway noise from cumulative and cumulative plus project traffic would not exceed the 70 dBA $L_{dn}$ standard along the majority of roadway segments.

Exterior amplified sound systems at the MLS Stadium could result in **potentially significant** noise at future residences. Existing residential receptors in the Alkali Flat neighborhood, the Mansion Flats neighborhood, the Cannery Place Apartments in the Township 9 development, the Dos Rios public housing project, the Quinn Cottages, and numerous social service shelters in the River District would be exposed to interior noise levels less than 45 $L_{dn}$ (assuming 20 dBA exterior-to-interior attenuation by the building structure).

Mitigation Measures

**Mitigation Measure 4.10-9(a) (RSPU)**

*Implement Mitigation Measure 4.10-3(a).*

**Mitigation Measure 4.10-9(b) (RSPU, MLS)**

*Implement Mitigation Measure 4.10-3(b).*

**Impact Significance After Mitigation:** Implementation of Mitigation Measure 4.10-9(a) and (b) would ensure that existing and planned residences are designed such that interior noise levels would not exceed the City standard of 45 $L_{dn}$. This impact would be considered **less than significant**.